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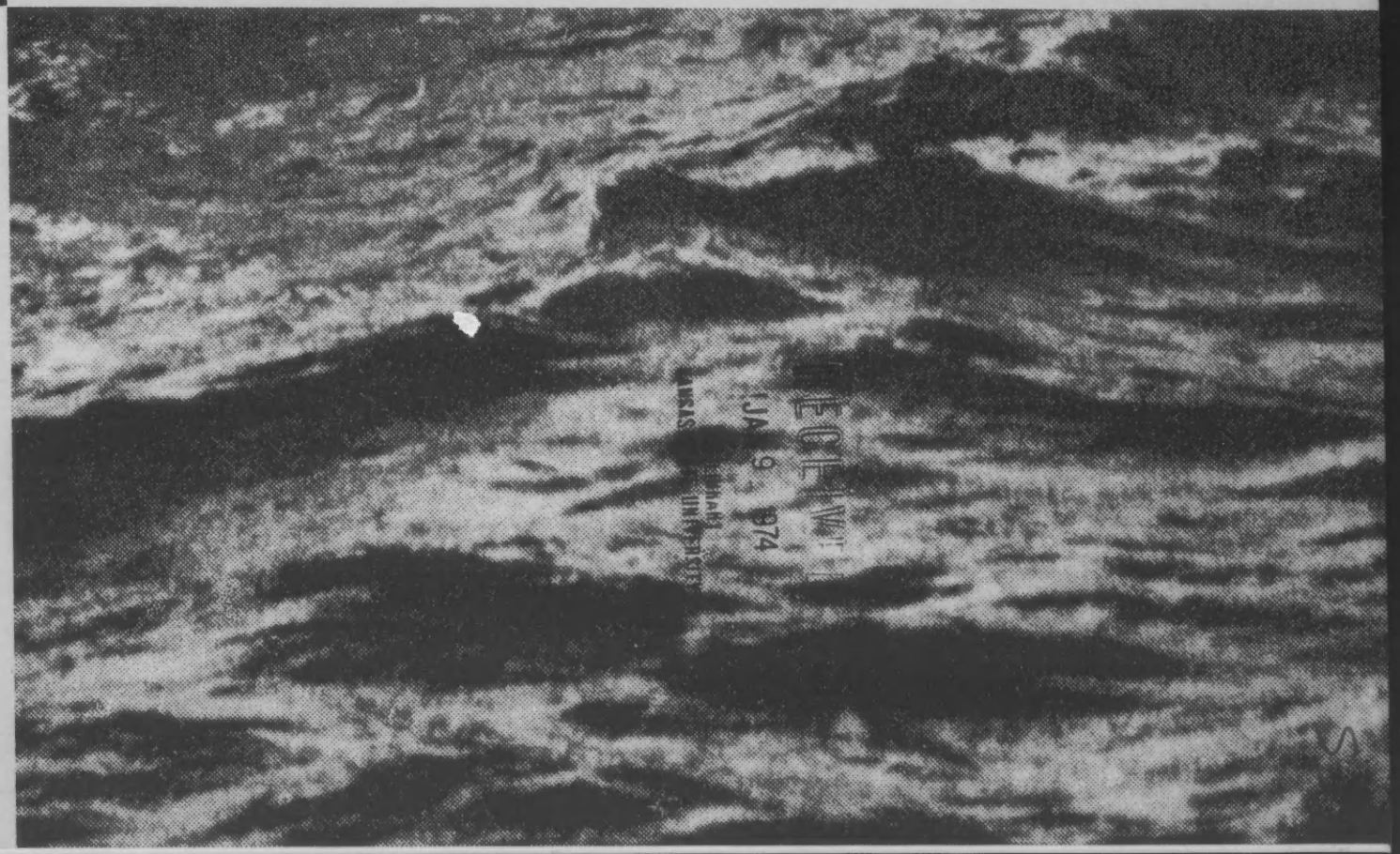

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FOREWORD

The Department of Commerce's National Marine Fisheries Service publishes the monthly journal *Commercial Fisheries Abstracts* as one means of communicating to the fishing industry and allied groups the status of current fishery research. The research includes the biological aspects of fishery science as well as technological studies dealing with aquatic resource supply, harvesting, processing, utilization, and distribution.

Commercial Fisheries Abstracts contains summaries of selected articles from trade, engineering, and scientific journals dealing with the entire spectrum of fishery science. The publication is designed to serve the needs of fishery scientists, engineers, and managers in industry, academic institutions, and government by supplying timely information on current progress in fishery research and technology.

For sale by the Superintendent of Documents, U.S. Government Printing Office Washington, D C 20402 - Subscription price: $3.50 per year ($1.00 additional for foreign mailing). Cost per single issue - $0.35.

0.32 SERUM LIPOPROTEINS OF THE PACIFIC SARDINE (SARDINOPS CAERULEA GIRARD)

Lee, Richard F., and Donald L. Puppione (Scripps Institution of Oceanography, La Jolla, CA 92037)
Biochimica et Biophysica Acta, Lipids and Lipid Metabolism 270, No. 2, 272-278 (June 19, 1972)

The physical and chemical properties of the lipoprotein classes of the serum of the Pacific sardine were characterized in order to (1) learn more about the lipid metabolism of an animal that ingests wax esters (from copepods) and (2) to test the possibility that such a diet might result in the presence of long chain alcohols or wax esters in the blood of the fish.

Compounds	Composition of sardine serum lipoproteins in weight %			
	VLDLF	LDLF	HDLF	Total serum
Cholesterol esters	60	16	20	22
Triglycerides	30	31	10	28
Polar lipids [1]	9	15	15	9
Phospholipids	1	35	55	30
Concentration of lipid in serum in mg./100 ml.	105	121	560	790

Abbreviations used: VLDLF, very low-density lipoprotein fraction; LDLF, low-density lipoprotein fraction; HDLF, high-density lipoprotein fraction.
Polar lipids group includes cholesterol, free fatty acids, and diglycerides.

The lipoproteins of the serum of the blood of the Pacific sardine were separated into ultracentrifugal density classes and data were obtained on the lipid compositions of these classes and the fatty acid distributions of cholesteryl esters, triglycerides, and phospholipids. The lipid composition of sardine serum lipoproteins is shown in the table.

The fatty acid composition of the triglycerides from the low-density fraction and the high-density

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0.35 ASCORBATE-NITRITE REACTION: POSSIBLE MEANS OF BLOCKING THE FORMATION OF CARCINOGENIC N-NITROSO COMPOUNDS

Mirvish, Sidney S., Lawrence Wallcave, Michael Eagen, and Philippe Shubik (Eppley Institute for Research in Cancer, University of Nebraska Medical Center, Omaha, NE 68105)
Science 177, No. 4043, 65-68 (July 7, 1972)

Most N-nitroso derivatives of secondary amines and amides are powerful carcinogens on several species. These derivatives may be produced in the human stomach by the acid-catalyzed reaction between nitrite, which is present in some foods, and N-nitrosatable compounds, which may be ingested as drugs at the same time. This possible hazard might be reduced by administering the drug together with a substance which preferentially reacts with and destroys any nitrite occurring in the stomach. Experiments were performed to determine the effectiveness of asorbic acid for this purpose.

Oxytetracycline was compounded as a mixture containing 80% ascorbic acid and treated with nitrite under conditions used by Lijinsky et al., Analysis and Formation of Nitrosamines, P. Bogovski, editor (International Agency for Research in Cancer, Lyon, France (in press). No nitration was observed. Further experiments with and without ascorbate confirmed that it almost completely blocked nitrosation.

The effect of ascorbate blocking nitrosation was examined in other amines. Using a 2:1 ratio of ascorbate to nitrite, 98% blocking of nitrosation occurred at all pH values for morpholine and piperazine. Blocking was only partial for N-methylaniline, but it was fairly complete for methylurea. Blocking was fairly effective for dimethylamine at pH 3 and 4, but at pH 2 there was little effect.

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0.35 THE EFFECT OF DIVALENT METAL BINDING ON THE ELECTRON SPIN RESONANCE SPECTRA OF SPIN-LABELED ACTIN. EVIDENCE FOR SPIN-SPIN INTERACTIONS INVOLVING MANGANESE(II)

Burley, R. W., J. C. Seidel, and J. Gergely (Department of Muscle Research, Boston Biomedical Research Institute; Department of Neurology, Massachusetts General Hospital; and Departments of Neurology and Biological Chemistry, Harvard Medical School, Boston, Mass.)
Archives of Biochemistry and Biophysics 150, No. 2, 792-796 (June 1972)

One mole of Ca^{2+}, Mg^{2+}, or Mn^{2+} can be bound per monomer of actin; earlier work has shown that replacing one of these cations with another does not change the ability of the actin to polymerize. However, the structure of actin may depend upon the kind of divalent cation combined with it, because differences in the rates of denaturation of Ca^{2+}, Mn^{2+}, and Mg^{2+} actin have been observed. Previous work has shown that F-actin can be spin labeled with N-(1-oxyl-2,2,6,6-tetramethyl-4-piperidinyl)maleimide without loss of its ability to polymerize or to interact with myosin; polymerization is accompanied by a change in the electron spin resonance (esr) spectrum. Earlier [Arch. Biochem. Biophys. 146, 597 (1971)], the present authors showed that the reaction of the spin label with F-actin is apparently restricted to a single thiol group. Other workers [J. S. Taylor, J. S. Leigh, Jr., and M. Cohn Proc. Natl. Acad. Sci. 64, 219 (1969)] demonstrated a dipolar interaction between Mn^{2+} and a spin label bound to creatine kinase resulting in a decrease in the size of the signal of a covalently bound nitroxide spin label. In addition, they have suggested that the magnitude of the decrease can be used to estimate the distance between the Mn^{2+} and the spin label [J. S. Leigh, Jr., J. Chem. Phys. 52, 2608 (1970)].

(over)

0,4 (0.7) THE CHEMICAL ELEMENTS OF LIFE

Frieden, Earl
Scientific American 227, No. 1, 52-57, 59-60 (July 1972)

Until a year or so ago, it was believed that 20 of the 90 naturally occurring elements are essential to life. Since then, four more elements appear to be essential for the growth of small animals; these elements are fluorine, silicon, tin, and vanadium. Nickel, aluminum, and germanium may turn out to be essential. The 20 elements are hydrogen, carbon, nitrogen, oxygen, sodium, magnesium, phosphorus, sulfur, chlorine, potassium, calcium, chromium, manganese, iron, cobalt, copper, zinc, selenium, molybdenum, and iodine. Boron is essential in some plants.

The exact role played by certain of the trace elements is not clear or is not known. The author believes that these gaps in our knowledge could be critical during a period when the biosphere is becoming contaminated by synthetic chemicals and subjected to a potentially harmful redistribution of salts and metal ions. Furthermore, new and exotic chemical forms (such as methyl mercury) are being discovered, and a complex series of competitive and synergistic relations among mineral salts have been observed.

Hydrogen accounts for 63% of the atoms in the human body; oxygen, 25.5%; carbon, 9.5%; and nitrogen, 1.4%. The remaining 20 essential elements account for less than 0.7% of the atoms in the body.

The functions of the essential elements and the interactions (synergistic and antagonistic) of the various essential metals are discussed. An example of the synergism between elements is the essentiality of copper for the proper metabolism of iron--an animal deprived of copper but not iron develops anemia because the

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0.39 (0.4) RETROGRESSION OF ALCOHOL-INDUCED FATTY LIVER BY TREATMENT WITH POLYUNSATURATED FATTY ACID-RICH DIETS

Irsigler, K., K. Krygspin-Exner, and F. X. Wholzogen (I. Med. Universitaets-klin, Vienna, Austria)
Chemical Abstracts 76, No. 13, 71343u (Mar. 27, 1972)

0.4 (0.7)
biosynthetic machinery fails to incorporate iron in hemoglobin molecules. An example of antagonism between metals is shown in the ability of sheep and cattle to absorb copper in greatly reduced amounts if too much zinc or molybdenum is present in their diet. Many basic facts are yet unknown concerning the role and interrelations of metal ions in nutrition and in health and disease. FTP

0.35

In the present study, the electron spin resonance spectra of actin spin labeled with N-(1-oxyl-2,2,6,6-tetramethyl-4-piperidinyl) maleimide and combined with the divalent metal Mg^{2+}, Ca^{2+}, or Mn^{2+} were compared. The shapes of the spectra of spin-labeled G-actin was found to be the same for each metal, but that with Mn^{2+} the size of the signal was smaller. This observation suggests that replacement of one divalent metal with another produces little or no change in the mobility of spin labels bound to actin. Replacing Mg^{2+} or Ca^{2+} with Mn^{2+} produced a 50% (maximum) decrease in the esr spectrum, suggesting spin-spin interactions between the spin label and Mn^{2+} bound to actin. This effect of Mn^{2+} was not altered by the polymerization of actin. The effect of Mn^{2+} on the size of the esr signal is the same for G-actin and F-actin; therefore, the distance between magnetic centers of Mn^{2+} and spin label does not change on polymerization. In F-actin, no spin-spin interactions occur between a spin label bound to an actin monomer and Mn^{2+} bound to an adjacent monomer.
[6 figures, 1 table, 11 references] FTP

0.4 LIPID BIOSYNTHESIS AND INCREASE IN ISOVALERIC ACID OF PLASMA

Malins, Donald C. (National Marine Fisheries Service, Northwest Fisheries Center, Seattle, WA 98102), Usha Varanasi (Department of Chemistry, Seattle University, Seattle, WA 98122), and John C. Wekell (National Marine Fisheries Service, Pacific Fisheries Products Center, Seattle, WA 98102)
Science 176, No. 4041, 1357 (June 23, 1972)

Hypoglycin A is a causative agent of the disease Jamaican vomiting. K. Tanaka, K. J. Isselbacher, and V. Shih [Science 175, 69 (1972)] found that when hypoglycin A is administered to rats their plasma shows an increase in isovaleric acid. This increase, they suggest, resulted from an overloading of the glycine conjugating system. In isovaleric acidemia (a disease with symptoms parallel to those of Jamaican vomiting sickness), the increase in isovaleric acid level in the plasma appears to be due to the inhibition of isovaleryl coenzyme A dehydrogenase. However, the authors suggest that an additional pathway involving lipid biosynthesis may also be operative. They suggest that blocking of the incorporation of the isovaleryl coenzyme A in lipid biosynthesis may be an additional factor in the accumulation of isovaleric acid in the plasma of patients afflicted with Jamaican vomiting sickness or isovaleric acidemia.
[5 references] FTP

0.32 NUTRITIONAL ASPECTS OF AMINO ACID METABOLISM. 2. EFFECTS OF STARVATION ON HEPATIC PORTAL-VENOUS DIFFERENCES IN PLASMA AMINO ACID CONCENTRATION AND ON LIVER AMINO ACID CONCENTRATIONS IN THE RAT

Bloxam, D. L. (Dep. Biochem., Univ. Coll., London, England)
Chemical Abstracts 76, No. 19, 111891e (May 8, 1972)

0.35

The blocking of N-nitrosation was attributed to competition for available nitrite (N_2O_3 and $H_2NO_2^+$). Ascorbate ion is 240 times more rapidly nitrosated than ascorbic acid. At pH 3 to 5 reaction of the ascorbate anion is so rapid that formation of N_2O_3 is rate limiting.

Nitric oxide produced by the ascorbate-nitrite reaction may combine with atmospheric oxygen to form nitrogen dioxide some of which would reenter solution and react with water to generate nitrous and nitric acids. Thus, up to half of the nitric oxide produced could potentially revert to nitrite; the presence of excess ascorbate minimized the effects of such reconversions.

Urea and ammonium sulfamate also react rapidly with nitrite; the effect of these compounds on nitrosation of piperazine and morpholine was examined. Urea was relatively ineffective; especially at higher pH values. Ammonium sulfamate was more effective than ascorbate at pH 1 and 2, but relatively ineffective at pH 3 and 4.

The authors suggest that drugs which have the potential of conversion to nitrosamines be combined with ascorbate before they are administered. Addition of ascorbate to foods containing nitrosable substances might also be considered.
[2 tables, 21 references] MS

0.32

fraction were very similar; however, the fatty acid composition of the cholesteryl esters and the phospholipids for these two lipoprotein classes was markedly different. Agarose gel electrophoresis of the serum of the Pacific sardine showed the presence of three distinct bands with α-like mobility, but no pre-β or β bands were detected in the whole serum or in any density fraction. This absence of lipoproteins with pre-β or β mobility in the sardine serum suggests that there are major differences between fat transport in mammalian and fish systems. FTP
[1 figure, 2 tables, 37 references]

0.34 ON THE BREAKDOWN OF NICOTINAMIDE ADENINE DINUCLEOTIDE (NAD) IN FISH MUSCLE POST MORTEM

Partmann, W.
Lebensm.-Wiss.+Technol. 5, No. 1, 14-16 (1972) (In German, English summary)
BFMIRA Abstracts 25, No. 5, Abstract No. 1647, 335 (May 1972)

0.4 (4.9)(4.82) NUTRITIONAL FACTORS AFFECTING THE OCCURRENCE OF EXPERIMENTAL ENCEPHALOMALACIA IN CHICKS

Bartov, I., and S. Bornstein (Division of Poultry Science, The Volcani Institute of Agricultural Research, Bet Dagan, Israel)
Poultry Science 51, No. 3, 868-876 (May 1972)

Earlier, unpublished work at the authors' laboratory indicated that the source of starch in a synthetic vitamin E-deficient diet may have a marked effect on the appearance of encephalomalacia in chicks. In the present study, they examined further some nutritional factors affecting the incidence of experimentally-induced encephalomalacia in chicks, with emphasis on (1) source of starch (potato or corn), (2) type of oil (safflower, soybean, cod liver, soybean soapstock), and (3) ingredient-derived (yellow corn and soybean soapstock) α-tocopherol (AT). White Rock male chicks were used in the experiments. A basal semisynthetic, vitamin E deficient diet, with and without BHT supplementation, was used, and the test nutrients were incorporated into the diets.

When potato starch was used as an ingredient in the semisynthetic vitamin E deficient diet containing oxidized safflower oil, with or without BHT supplementation, it caused a higher incidence of encephalomalacia in chicks than did corn starch under the same experimental conditions. This difference may be caused indirectly. The chicks fed diets containing potato starch consumed more feed than those fed diets containing corn starch; as a result their intake of oxidized safflower oil increased correspondingly. This increase in intake of oxidized safflower oil by the chicks increased their corresponding requirement for AT, thus increasing the incidence of encephalomalacia. The two starches also seemed to show a differential effect on the stability of the fat in the diet; either corn

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0.5 ANTIGENIC RELATIONSHIPS AMONG STRAINS OF VIBRIO PARAHAEMOLYTICUS

Twedt, R. M., P. L. Spaulding, and H. M. Johnson (Division of Microbiology, Food and Drug Administration, Cincinnati, OH 45226)
Applied Microbiology 23, No. 5, 966-971 (May 1972)

This paper reports on a tube agglutination study of the antigenic relationships of 79 strains of V. parahaemolyticus representing 46 assigned K-antigen types. The purpose of the study was to clarify antigenic relationships among V. parahaemolyticus isolated from marine and clinical sources. The 79 cultures were isolated from feces of patients suffering from gastroenteritis, from food implicated in food poisoning outbreaks, and from sea fish and sea water.

The homologous titers of 46 anti-K sera ranged from 80 to 2,560. The majority (36) ranged between 160 and 640; the mode was 320. All except three antisera exhibited from 1 to 6 heterologous reactions; most of them gave titers of ≤20. However, 19 sera exhibited cross-reactions whose titers exceeded 40. Nine reciprocal and 16 unilateral relationships were noted among the antisera. Some of the cross-reactions involved heat-extractable K-antigens, whereas others did not involve K-antigens because absorption with the heterologous antigens had no effect on the homologous system. Apparently, many of the reciprocal and nonreciprocal heterologous reactions occurred between K-types that are not regarded as members of the same O-antigen group. The authors conclude that the data indicate that more study is needed before serotyping of V. parahaemolyticus according to their K-antigens can become a routine procedure.

[7 tables, 23 references]

FTP

0.6 (6.55) EFFECTS OF CHEMICAL ADDITIVE AND OF FORMALDEHYDE-GAS FUMIGATION ON SALMONELLA IN POULTRY FEEDS

Duncan, M. S., and A. W. Adams (Department of Dairy and Poultry Science, Kansas State University, Manhattan, KS 66502)
Poultry Science 51, No. 3, 797-802 (May 1972)

Domestic animals are considered the largest single reservoir of Salmonella organisms. Salmonella-contaminated feed has been implicated as a major contributor in maintaining this reservoir. This article reports on the effectiveness of adding a commercial product (containing 53.8% active ingredients consisting of propionic acid, isopropyl alcohol, and phosphoric acid; and 46.2% inert ingredients) and of fumigating with formaldehyde gas on Salmonella in poultry feeds and feedstuffs. Chick starter, fish meal, and meat-and-bone meal were artificially contaminated with S. seftenberg 775W at a level of 2×10^6 cells per gram of feed.

In the test with the commercial additive, the product was added to the contaminated feeds at levels of 0.1% and 0.2%. A standard quantitative test for Salmonellae was made on the test feed samples at periodic intervals during a 10-day storage period (to determine the effect of the additive on the Salmonellae in the feeds). Reduction in the levels of Salmonella in the test samples did occur, but they were not related to the presence of the additive. The reduction in levels of Salmonella resulted from spontaneous reduction rather than to any effect of the chemical additive. The degree of reduction of Salmonella differed among the types of feeds: chick starter showed the greatest reduction in the organism and meat-and-bone meal the least. The differences may be due to the differences in water activity (a_w) of the feeds.

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0.6 (0.7) LINEAR PROGRAMMING CONTROLS AMINO ACID BALANCE IN FOOD FORMULATION

Cavins, J. F., G. E. Inglett, and J. S. Wall (Northern Regional Research Laboratory, U.S. Department of Agriculture, ARS, 1815 N. University Street, Peoria, IL 61604)
Food Technology 26, No. 6, 46, 48-49 (June 1972)

This article describes the use of linear programming techniques for the formulation of cereal-based foods in which the total essential amino-acid pattern (EAP) is controlled, and the use of a particular cereal ingredient and the cost are minimized. The cereal ingredients evaluated were corn, oats, and millet; the oil seed ingredients were defatted soy flour and cottonseed flour. Nonfat dry milk was considered in all the cereal mixtures because it is a source of good quality protein, is readily available, and helps improve the flavor of the products.

Parametric linear programming was used to formulate the optimum blends. The model contained equations for protein level, essential amino-acid pattern, ingredient level, and weight. The protein levels [(N)(6.25)] were set at 19% as the lower limit and 22% as the upper limit. The upper limit of oilseed meal plus nonfat dry milk solids was set at 35% so that the cereal level would be 65% or higher.

Several formulations were prepared and examined organoleptically and for protein efficiency ratio values (PER). A standard corn-soya-milk (CSM) mixture was examined for reference purposes. The composition and evaluation of the experimental samples are shown in the table that follows.

(over)

0.5 (7.85) COMPUTER PROGRAM ESTIMATES BACTERIAL DENSITIES BY MEANS OF THE MOST PROBABLE NUMBERS

Parnow, Robert J. (Pillsbury Co., Research and Development Laboratories, 311 Second St., S.E., Minneapolis, MI 55414)
Food Technology 26, No. 7, 56, 58, 60, 62 (July 1972)

The author has developed a computer program for estimating the density of a bacterial population when dilution assay is used as the enumeration method. Estimation is by most probable numbers. Basic theory used to derive the equation for the computer program is discussed. The article contains two tables of MPN values, standard errors, and confidence limits for three tube dilution levels (the first table) and five tube dilution levels (the second table). Copies of the complete tables and of the computer program may be obtained by writing to the author.
[2 tables, 20 references] FTP

0.8 FISH-PROCESSING INDUSTRY AND SEWAGE TREATMENT

Ventz, Dieter (Buero Forsch. Enwickl., Wasserwirtschaftsdir. Kueste-Warnow-Peene, Stralsund, Germany)
Chemical Abstracts 76, No. 26, 158007m (June 26, 1972)

0.8 MECHANICAL CLEANING OF WASTE WATERS FROM FISH CANNERIES (3,330)(9,19)

Shifrin, S. M., I. B. Fesenson, and A. N. Zabbarov (U.S.S.R.)
Chemical Abstracts 76, No. 22, 131182c (May 29, 1972)

0.6 (0.7)

Components [1] of the mixture	Ingredient maximized	Proportions of ingredients in mixture	Protein efficiency ratio (PER) [3]	Organoleptic observations	
				Relative odor score	Relative flavor score
Corn/soya/milk [2]	--	69/26/5	2.27	8.0	8.0
Corn/soya/milk	corn	72/26/2	2.28	8.5	8.3
Millet/soya/milk	millet	65/30/5	1.95	6.2	3.6
Corn/oats/soya/milk	oats	43/34/18/5	2.05	7.8	7.9
Corn/soya/cottonseed/milk	cottonseed	68/27/2/3	2.25	7.6	7.6
Corn/soya/cottonseed/milk	--	68/20/9/3	2.10	7.3	7.1

[1] Corn = Corn grits; oats = oat groats; millet = Proso millet dehulled; soya = defatted soy flour; cottonseed flour; milk = nonfat dry milk solids.
[2] CSM = standard corn-soya-milk mixture.
[3] Compared with Animal Nutrition Research Council reference casein of PER = 2.50.

The authors conclude that computers can be used for formulating food products that have no significant change in flavor and are nutritionally adequate.
[4 tables, 11 references] FTP

0.4 (4.9)(4.82)

starch contains some factor that accelerates lipid oxidation or potato starch contains a factor that partly inhibits lipid oxidation.

Encephalomalacia in chicks was promoted by the following ingredients in the diet in decreasing order: oxidized soybean oil, fresh safflower oil, and oxidized soybean soapstock. Fresh cod-liver oil or oxidized cod-liver oil caused relatively few cases of encephalomalacia. Fresh soybean oil or fresh soybean soapstock did not induce the disease.

Yellow corn or soybean soapstock, when incorporated into an encephalomalacia-inducing diet, lowered the incidence of the disease in chicks in proportion to the amount of α-tocopherol or total reducing substances that these ingredients supplied. This effect produced by total reducing substances (that are not AT) may be due to their ability to protect the low levels of natural AT in the diets. Reducing substances (non α-tocopherol) in the diet markedly decreased mortality of the chicks due to encephalomalacia in the presence of relatively low levels of dietary α-tocopherol.
[1 figure, 4 tables, 30 references] FTP

0.4 CATALYSIS OF NITROSATION BY THIOCYANATE FROM SALIVA

Boyland, E., E. Nice, and K. Williams (Chester Beatty Res. Inst., London, England)
Chemical Abstracts 76, No. 19, 108833g (May 8, 1972)

0.6 (6.55)

In the fumigation test, the Salmonella-contaminated feeds were fumigated with formaldehyde-gas at 37° C. and 60% relative humidity. Total fumigation time was 20 min. The standard qualitative test was run for Salmonella on the treated test samples. Fumigating the feeds for 20 min. eliminated Salmonella in the feed to depths of up to 1.91 cm. Salmonella was eliminated in 9.1 kg. of the contaminated feed, when this amount of feed was fumigated for 5 min. during continuous mixing.

The authors indicated that formaldehyde-gas fumigation of the feed did not affect its palatability nor biological value to broilers.
[1 figure, 9 tables, 9 references] FTP

0.6 (PROTEINS) MICELLIZATION AND HYDROPHOBIC INTERACTIONS

Stauffer, C. E.
Cereal Sci. Today 17, No. 1, 17-20 (1972)
BFMIRA Abstracts 25, No. 5, Abstract No. 1578, 320 (May 1972)

Hydrophobic interactions in relation to micelles, solubility and protein stability are discussed. J.A.D. Reprinted

0.6 (7.0) STUDIES ON THE FUNCTIONAL PROPERTIES OF FOOD-GRADE SOYBEAN PRODUCTS. PART I. CLASSIFICATION OF SOYBEAN PRODUCTS BY THEIR CHEMICAL CONSTITUENTS AND PROTEIN PROPERTIES

Yasumatsu, Katsuharu, Jun Toda, Masahiro Kajikawa, Nagaoki Okamoto, Hiroshi Mori, Motoaki Kuwayama, and Kiyofumi Ishii (Food Research Laboratories, Food Products Division, Takeda Chemical Industries, Ltd., Osaka, Japan)
Agricultural and Biological Chemistry 36, No. 4, 523-531 (Apr. 1972)

A food ingredient is incorporated into a formulation because of its functional properties which will give to the final product characteristics that are acceptable to the consumer. For example, in the preparation of ice cream a food ingredient capable of forming emulsions is added to provide for miscibility and impart a smooth texture to the finished product. Various soybean products are used in food manufacturing for their functional, economic, and nutritional characteristics. Other commodities are incorporated for similar purposes. The authors have performed a series of experiments designed to test the correlation of soybean products by function to a limited number of chemical constituents and protein properties. [The same rationale may be applied to food products added for a particular function such as protein enrichment. Abstractor's note]

Samples of 43 commercial soybean products and, to compare functional properties, three gluten products, and three casein products were analyzed for the following: crude ash, crude fat, crude fiber, crude protein, nitrogen-free extract, magnesium, calcium, potassium, and sodium.

Results indicate that the content of crude protein correlates negatively with all other characteristics, and positively with Na content. Sodium correlates negatively with nitrogen-free extract and all other metals present.

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0.7 NUTRIENTS IN UNIVERSITY FOOD SERVICE MEALS. I. DATA DETERMINED BY FOOD INVENTORY

Guild, Louise, Dorothy Deethardt, and Elizabeth Rust (South Dakota Agricultural Experiment Station, Department of Home Economics, Brookings, SD 57006)
Journal of the American Dietetic Association 61, No. 1, 34-37 (July 1972)

Data on selected nutrients (protein, fat, certain fatty acids, carbohydrates, certain minerals, and certain vitamins) in foods served at a university food service during five 1-month periods, are reported. The contributions of these nutrients by the food groups are also given. Except for iron, the nutrients were supplied in sufficient amounts so that, allowing for cooking waste, cooking losses, and food not eaten, the students should have been able, by making appropriate choices, to meet the Recommended Dietary Allowances. The sources of fatty acids and cholesterol in the foods served are shown in the table that follows.

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0.6 (7.0) STUDIES ON THE FUNCTIONAL PROPERTIES OF FOOD-GRADE SOYBEAN PRODUCTS. PART II. FLAVOR PROFILE

Yasumatsu, Katsuharu, Jun Toda, Hisashi Aoki, Takeo Wada, and Kiyofumi Ishii (Food Research Laboratories, Food Products Division, Takeda Chemical Industries, Ltd., Osaka, Japan)
Agricultural and Biological Chemistry 36, No. 4, 532-536 (Apr. 1972)

Undesirable flavor characteristics have been the major barrier to larger use of soybean products in foods. In part I of this series, correlation of functional properties of soybean products to chemical constituents and protein properties was investigated.

In this report the correlation of flavors to the properties of soybean products was investigated. The same soybean products and data on proteins and chemistry reported in part I were used.

Organoleptically, four undesirable "soybean" flavors and two acceptable "milk" and "miscellaneous" flavors were identified. The most purified product (soy protein isolate) and the least purified product (defatted soy flour) had the same major soybean flavor, indicating that degree of purification is not directly proportional to removal of inherent soybean flavor.

Soy protein extract is high in the desirable miscellaneous flavor score compared to other soybean products and is used in the industry as a milk substitute with added flavors such as vanilla. Defatted soybean flavor, undesirable for food use, is correlated with the amount of crude fiber. Extraction of soy protein from crude fiber is an effective process to reduce the soybean flavor in the resulting

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0.7 NUTRIENTS IN UNIVERSITY FOOD SERVICE MEALS. II. DATA FROM MEALS SELECTED BY STUDENTS

Guild, Louise, Dorothy Deethardt, and Elizabeth Rust (South Dakota Agricultural Experiment Station, Department of Home Economics, Brookings, SD 57006)
Journal of the American Dietetic Association 61, No. 1, 38-41 (July 1972)

Part I, on pages 34-37 of this same issue, reported data on the selected nutrients of foods used in preparing meals in a university food service, as determined by calculations based on the inventory records of foods issued. This part II reports on the nutrients contributed by 604 meals selected by a sample group of students at the same university food service. During the spring and fall periods of the 5-month inventory study (see part I of this series), the foods selected by the sample population in the cafeteria line at each of three meals, the number of servings, and the size of servings (when self-service was permitted) were recorded. The choices of foods were limited, but each student could have additional milk. The study did not include snacks. Calculations were made of the protein, fat, carbohydrate, certain minerals, certain vitamins, and certain fatty acids contents of the meals selected by the students.

Except for acceptance or rejection of the dishes offered, the greatest variation in the meals was in the amount of milk consumed. Except for the iron intake of women students (which averaged only about 10 mg.), the average intakes of nutrients for daily meals met or exceeded the Recommended Dietary Allowances for young adults. The meal-to-meal variation for most of the nutrients in most meals was greater than the day-to-day variation. The students obtained 16% of the calories from protein and the rest from the fat and carbohydrate, almost equally divided.

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0.7 PLANNING MEALS FOR THE BACKPACKER WITH DIABETES --
(0.4) NUTRITIONAL VALUES OF FREEZE-DRIED FOODS

Labrenz, Janice Bate (The Mason Clinic, Seattle, WA 98101)
Journal of the American Dietetic Association 61, No. 1, 42-48 (July 1972)

This report contains information on backpacking-style meals for persons with diabetes. One table lists the carbohydrate, protein, fat, and calories (proximate composition) of 108 commercial freeze-dried food products. Two sample menus for 1 day's meals (breakfast, morning snack, noon meal, afternoon snack, evening meal, bedtime snack) are given.
[2 illustrations, 2 tables, 1 reference] FTP

[5 tables, 5 references] FTP

Food Group	Amount of the following in the food served per person per day			
	Total saturated fatty acids	Oleic acid	Linoleic acid	Cholesterol
Dairy products	28	15	--	160
Meat, fish, poultry, eggs	22	23	3	345
Cereal foods and mixes	2	6	1	--
Fats, nuts, dressings	6	15	7	--
Total	61	59	13	505

0.7

0.7 THE STATUS OF ZINC IN HUMAN NUTRITION

Fox, M. R. Spivey
Wld Rev. Nutr. Diet. 12, 208-226 (1970)
BFMIRA Abstracts 25, No. 6, Abstract No. 2057, 416 (June 1972)

This is a review of current knowledge on the symptoms of zinc deficiency, requirement for zinc in normal and abnormal physiological states, and the metabolic function and metabolism of zinc. There is a comprehensive reference list.
L.P. Reprinted

[5 figures, 5 tables, 17 references] SW

The properties of protein were investigated by measuring dispersibility, total amount, and degree of denaturation. Enzyme activity was also measured. There was high correlation between amount of native protein and enzyme activity. There was low correlation between water dispersible nitrogen and enzyme activity. Presence of the metals Mg, Ca, and K correlated positively with fiber and nitrogen-free extract and negatively with protein content. The amount of sodium present correlates positively with protein content and negatively with fiber and nitrogen-free extract. Correlation of water dispersible nitrogen and amount of native protein is low because some of the protein is denatured but soluble, consequently both properties should be tested for independently in studying functional properties of soybean products.

0.6 (7.0)

0.6 BALANCED NUTRITION THROUGH FOOD PROCESSOR PRACTICE
(0.7) OF NUTRIFICATION. MODEL EXPERIENCE IN SCHOOL FOOD SERVICE

Lachance, Paul A., Ruth Brown Moskowitz, and Henry H. Winawer (Department of Food Science, Rutgers University, New Brunswick, NJ 80903)
Food Technology 26, No. 6, 30, 32-34, 36, 40 (June 1972)

This article reports on the authors' experience, using a school food service as a model, in the improvement of the nutritional aspects of an institutional feeding system. The work, a cooperative project between Rutgers University and 80 food processors, demonstrated that the nutritional effectiveness of school feeding programs could be improved. This enhancement was accomplished by (1) testing the acceptance of the foods to the school children, (2) the adding of selected micronutrients based on the Recommended Dietary Allowances (in order to provide a balance of nutrients within and among the food products), and (3) the improvement of the convenience aspect of the food through simplification of the food service techniques.
[7 figures, 5 tables, 8 references] FTP

[4 tables, 7 references] FTP

Women students consumed a greater proportion of the day's calories at breakfast and less at lunch than the men did. Simple forms of carbohydrate comprised more than half the total (simple forms were sucrose and lactose; complex forms were starch, dextrin, cellulose, and pectin). Men consumed 1.5 times as much fat as the women. Saturated fatty acids represented 40% of the total consumed; the polyunsaturated-to-saturated fatty acids ratios were 0.35 for women and 0.27 for men.

0.7

0.6 STUDIES ON THE FUNCTIONAL PROPERTIES OF FOOD-GRADE
(7.0) SOYBEAN PRODUCTS. PART III. PROPERTIES OF HEAT-COAGULATED GELS FROM SOYBEAN PRODUCTS

Yasumatsu, Katsuharu, Jun Toda, Takeo Wada, Masaru Misaki, and Kiyofumi Ishii (Food Research Laboratories, Food Products Division, Takeda Chemical Industries, Ltd., Osaka, Japan)
Agricultural and Biological Chemistry 36, No. 4, 537-543 (Apr. 1972)

Gel formation is an important functional property of food-grade soybean products. In parts I and II of this series, correlation of functional properties and flavor of soybean products to chemical constituents and protein properties was investigated. In this report, the correlation of gel formation to the properties of soybean products, found in part I, was studied. To clarify the properties of heat-coagulated gels, subjective and objective texture measurements were made. The gels were classified into "hard gel," "soft gel," and "paste products." It was found that hard gel products have crude protein contents of more than 75%, and soft gel products have crude fiber contents below 1%. In addition, most of the paste products have crude fiber contents above 1% and form gels with textural properties like mashed potatoes.
[1 figure, 6 tables, 9 references] SW

[1 figure, 3 tables, 8 references] SW

product. "Raw soybean flavor," also undesirable, shows high correlation to the amount of native protein and enzyme activity; heat treatment to reduce native protein and enzyme activity appears to be a method for elimination of the flavor.

0.6 (7.0)

0.7 UTILIZATION OF NONPROTEIN NITROGEN
[NUTRITION SOCIETY SYMPOSIUM]

[Authors and titles listed below]
Federation Proceedings 31, No. 3, 1151-1193 (May-June 1972)

The introduction and five articles of this symposium are from the American Institute of Nutrition Symposium presented at the 55th Annual Meeting of the Federation of American Societies for Experimental Biology, Chicago, Ill., April 14, 1971. The articles deal primarily with the utilization of nonprotein nitrogen in ruminants, lower nonruminant species, and man. Each author summarizes the status of present knowledge and indicates areas in which additional research is needed. The introduction and articles are as follows:

"Introductory Remarks," by Willard J. Visek (Department of Animal Science, Cornell University, Ithaca, NY 14850), ibid., p. 1151. [1 reference]

"Metabolic Aspects of Nonprotein Nitrogen Utilization in Ruminant Animals," by William Chalupa (Faculty of Nutrition and Department of Dairy Science, Clemson University, Clemson, SC 29631), ibid., pp. 1152-1164. [5 figures, 1 table, 180 references]

"Nonamino and Amino Nitrogen in Nonruminant Nutrition," by D. Lewis (Department of Applied Biochemistry and Nutrition, University of Nottingham, England), ibid., pp. 1165-1171. [5 figures, 4 tables, 31 references]

"Nonspecific Nitrogen in the Nutrition of Human Beings," by Constance Kies (Department of Food and Nutrition, University of Nebraska, Lincoln, NE 68503), ibid., pp. 1172-1177.

(over)

1.0146 THE CRAWFISH INDUSTRY OF IRELAND
(1.89)

Culley, Michael, and Paul Driver (Portsmouth Polytechnic, The Marine Laboratory, Ferry Road, Hayling Island, P.O. 11 ODG, England)
Fishing News International 11, No. 4, 32-36 (Apr. 1972)

Of the shellfish landed in Ireland, crawfish (Palenarus vulgaris or P. elaphas) form a substantial part of the total. The fishery for crawfish is well established; substantial investments have been made in it recently and before the war. The coasts of Ireland are divided into four fisheries areas. Off the west and south coasts lie the most important crawfish areas with a minor area off the north coast.

The areas where the crawfish are taken reflect the occurrence of the warmer waters of the North Atlantic Drift. The crawfish is a warm water species inhabiting crevices and steeply sloping faces of rock reefs down to 200 ft. along the rocky coasts. The currents in these areas are often fast flowing which makes capturing them difficult and hazardous. The main fishing season is May to September, and it sometimes begins a month earlier and ends a month later. Peak activity depends on the weather; the greater landings occur in good weather.

Crawfish are taken in pots of the French barrel design. The fish boats range from small open boats with outboard engines to boats of 70 ft., which are also trawlers. The smaller boats can tend about 40 pots, and the larger about 200 pots. In other places on the grounds, trawls are used. Among the factors influencing catches, one of the most important may be the migration of crawfish to and from deep water.

(over)

1.1 ANNUAL REPORT OF THE INTER-AMERICAN TROPICAL TUNA COMMISSION
(1.019)

Peterson, Clifford L. (editor) (Inter-American Tropical Tuna Commission, c/o Scripps Institution of Oceanography, La Jolla, Calif.)
Published by the Inter-American Tropical Tuna Commission, c/o Scripps Institution of Oceanography, La Jolla, Calif., 129 pp. (1971). Price $2.00.

The Inter-American Tropical Tuna Commission operates under a convention originally entered into by the Republic of Costa Rica and the United States in 1950. Later, Panama, Ecuador, Mexico, Canada, and Japan adhered to the convention. Ecuador withdrew from adherence to the convention in 1968.

The duties of the Commission are to study the tunas and related species of the eastern Pacific to determine the effects of fishing and natural factors on their abundance, and to recommend appropriate conservation measures to maintain the stocks. On the basis of information generated by the studies the Commission recommended in 1962 that the yellowfin tuna fishery in the eastern Pacific Ocean be placed under international management to ensure maximum harvests on a sustained basis. The fishery under management is called the Commission's Yellowfin Regulatory Area (CYRA). In 1969, the Commission implemented a 3-year experimental fishing program to ascertain empirically the maximum sustainable yield of yellowfin tuna from CYRA. The experiment called for an annual catch of 120,000 short tons to be taken in 1969, 1970, and 1971. For 1971, the quota was increased to 140,000 short tons. The fleets of all nations in 1971, caught about 114,200 short tons of yellowfin tuna and about 115,230 short tons of skipjack tuna in the CYRA. The yellowfin tuna catch was substantially below the recommended quota for 1971. The

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1.22 ALASKA'S FISHERY RESOURCES -- THE PACIFIC HERRING
(1.0112)

Reid, Gerald M. (Auke Bay Fisheries Laboratory, National Marine Fisheries Service, NOAA, Auke Bay, AK 99821)
NMFS Extension Publication, Fishery Facts-2, 20 pp. (June 1972) (NOAA, National Marine Fisheries Service, U.S. Department of Commerce, Seattle, Wash.) Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price $0.25.

The Pacific herring, Clupea harengus pallasi, is a valuable natural resource in the coastal waters of Alaska, not only because of its direct commercial significance but also because of its importance as a component in the complex food cycle of other commercially valuable fishes.

Pacific herring are indigenous to the North Pacific rim and are closely related to the herring of the Atlantic Ocean.

Pacific herring generally spawn on intertidal vegetation in the spring. Although spawning is often successful in terms of density, subsequent mortality of eggs and larvae may exceed 99%.

Herring abundance fluctuates greatly. Biologists have attempted to understand and predict fluctuations by studying changes in the numerical strength of different year classes of herring taken by the commercial fisheries.

Commercial utilization of Alaska herring by American fishermen is at a low level because of various socioeconomic problems, although thousands of tons were taken in the past for food and industrial products. Foreign vessels are currently taking large quantities of herring in areas offshore from Alaska. A viable herring

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1.0146 (1.89)

Before 1967 the price of crawfish was increasing moderately in relation to size of catch. Since 1968 the value has been increasing and, in 1970, rose steeply in relation to size of catch. Landings in Mayo, Galway, Kerry, and Cork Counties have had good indications of catch per unit effort. Of these counties, landings in Galway were the highest for total catch but were one of the lowest in catch per unit effort, indicating that the stocks are being exploited heavily.

The Irish Government considers the smaller individual fisherman to be the foundation of the inshore fishing industry and favors this type of venture with readily available financing in the form of grants and loans.

At the end of the crawfish season, the vessels over 45 ft. can change gear for other types of fishing. Fishermen who do not fish in the winter may work on farms or other tasks in the fishing industry. Unemployment compensation and other assistance reduces hardship during the winter. The merchants operate large storage facilities to maintain a supply of live crawfish. They sell the crawfish in three size grades: large, medium, and small. Consumers prefer small crawfish, and accordingly high prices are paid for the grade. The prices paid to fishermen fluctuate and follow a seasonal pattern, increasing at Christmas. Most crawfish are exported to France and Spain. Transportation in Ireland is not good and makes for difficulties in marketing.

The processing and marketing side of the crawfish industry also receives government assistance in the form of marketing development, technological research, and financial aid.

[1 figure, 2 maps, 3 illustrations, 6 references] SW

1.22 (1.0112)

industry might develop if an economical method of producing fish protein concentrate from fatty fish is developed. Alaska herring reduced to the concentrate could provide an essential item in the diet of peoples of protein-deficient nations. [13 figures] Author's abstract

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2.11 SAN PEDRO WETFISH FLEET: MAJOR PURSE-SEINE GEAR CHANGES, 1952-1972

Knaggs, Eric H. (California Department of Fish and Game, 350 Golden Shore, Long Beach, CA 90802)
Commercial Fisheries Review 34, Nos. 5-6, 10-32 (May-June 1972)

In 1952, the San Pedro purse-seine fleet consisted of 161 vessels. It dwindled to 42 by 1972. Very few new vessels have been constructed; all but 4 are 23 years old or older.

Although the fleet has decreased, definite improvements have been made in purse-seine gear and techniques.

The two most important changes are the use of nylon netting (replacing cotton netting) and the Puretic power block.

Twenty-eight other changes in equipment represent successful original developments, improvements, or modifications of existing gear.

[18 figures, 21 references] Author's abstract

0.7

Nonspecific nitrogen is defined as nitrogen that is metabolically available and leads to minimal toxicities in the quantities used. Nonspecific nitrogen may include amino nitrogen furnished by nonessential amino acids, amino nitrogen from essential amino acids, and nonamino acid nitrogen from sources such as urea and diammonium citrate. The author states that the role of nonspecific nitrogen in human nutrition is not clear. Results so far indicate that intake of nonspecific nitrogen can spare specific essential amino acids and protein. More information is needed on the nutritive role of nonspecific nitrogen to provide an understanding of its possible role in meeting the protein needs of the world's human population. [43 references]

"Effects of Urea Hydrolysis on Cell Life-Span and Metabolism," by Willard J. Visek, ibid., pp. 1178-1193. [2 figures, 247 references] FTP

0.8 CURRENT PRACTICE IN SEAFOODS PROCESSING WASTE TREATMENT

Soderquist, M. R. et al.
Wat. Pollut. Abstr., 44, No. 9, abstr. No. 1899 (1971)
BFMIRA Abstracts 25, No. 6, Abstract No. 2257, 457 (June 1972)

"The authors review the processing of the major seafood species in U.S.A., the volume and composition of the resulting waste waters, and the methods currently used for waste treatment and recovery of by-products, and put forward recommendations for research on pollution abatement. A bibliography of 258 references is appended, together with a summary of water quality standards in different states." Reprinted

1.1 (1.019)

decrease was assumed to be due to the problem of public awareness of mercury contamination in tuna meat which brought low demand in the markets. The skipjack tuna catch represents the second highest on record and is about 60,000 tons greater than that taken in 1970. By resolution of the Commission, unrestricted fishing for tuna was terminated.

The percentages by flag of the 1971 catch are as follows:

Flag	Yellowfin tuna	Skipjack tuna
Canada	3.7	5.3
Ecuador	6.3	11.7
Japan	1.3	0.3
Mexico	6.0	4.3
Panama	2.0	4.1
United States	77.8	72.6
Colombia, Costa Rica, France, Bermuda, Peru, Spain	2.9	1.7

The trend in fishing vessels is increasing toward seiners. By 1971 seiners with a capacity of 401 short tons or more represented 75% of purse seine capacity. The major share of yellowfin and skipjack tuna has been captured by purse seine vessels. Based on the catch per standard day's fishing (CPSDF) as an index of the relative apparent abundance of tuna, the stocks are fluctuating, declining under heavy fishing pressure, and advancing when the fishing is restricted. In 1971, the CPSDF showed a sharp decline from levels of the previous 3 years. SW

1.3 TIMING, ESCAPEMENT, DISTRIBUTION, AND CATCH OF KODIAK ISLAND SALMON, 1970

Bevan, Donald E. (Fisheries Research Institute, College of Fisheries, University of Washington), Jack Lechner, and Martin F. Eaton (Alaska Department of Fish and Game)
Fisheries Research Institute Circular 72-8, 71 pp. (June 26, 1972) (College of Fisheries, University of Washington, Seattle, WA 98195)

Since 1952, yearly estimates of the timing, magnitude, and distribution of the salmon escapement in the streams of the Kodiak area have been obtained. Pink salmon is the most important species in the area.

A comparison of escapement counts in 1970 with the even year averages of 1952 to 1968, and of the catch data in 1970 with even year averages from 1954 to 1968 indicates that the timing of the run was slightly earlier than normal.

The total catch of sockeye salmon, 916,115 fish, was the highest since 1950. The total catch of chum salmon was about 920,075 fish. For pink salmon the total catch was 12,036,598 fish, about 5,750,000 above the past 23-year average. The major portion of the catch was taken from the eastside and Uyak-Uganik districts. All districts produced good pink salmon catches except Olga-Moser Bays. The case pack of pinks was estimated to be 492,000 cases, about 196,000 above the 20-year average.

Although the total catch for the Kodiak area (13,941,230 fish) was one of the highest, increased units of gear participating in the fishery resulted in below average catches for numerous fishermen. Escapements were less than desired. Intense fishing effort and violations of waters closed to commercial fishing was

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2.06 MINCED FISH FLESH HAS MANY USES

Davis, P. (Fisheries Division, Department of Primary Industry, Canberra, A.C.T. 2600, Australia)
Australian Fisheries 31, No. 5, 12 (May 1972)

Fish sausage and a fish paste called kamaboko are Japanese foods made from fish fillets chopped up with other ingredients. Minced fish flesh is now available, and it is proving to be a satisfactory substitute for chopped up fillets in the preparation of kamaboko. A joint venture between Japanese and New Zealand companies has been established in New Zealand for the production of minced fish flesh for export to Japan.

Increased consumer acceptance of minced fish flesh makes possible more economic use of the fish carcass through application of deboning machines. [For example, after hand filleting, the fish remains can be processed through a deboning machine, and the yield of flesh can then be minced. Abstractor's note] Minced fish flesh may also be derived from edible fish not presently utilized. Yields of shrimp, crab, and lobster meat can also be increased by processing through the deboning machine. The properties of minced fish flesh vary according to particle size and species of fish, and may be altered by use of additives. Processing must take place under carefully controlled conditions to avoid damaging the flesh protein. Quality control and inspection techniques have been devised to maintain standards that have gained consumer acceptance. Species of fish inhabiting Australian waters are being investigated for applicability to minced fish flesh production.

SW

1.3 (9.12) THE STOCK CONCEPT IN PACIFIC SALMON

Simon, Raymond C. (Department of Fisheries and Wildlife, Oregon State University, Corvallis, OR 97331), and Peter A. Larkin (Institute of Animal Resource Ecology, University of British Columbia, Vancouver 8, British Columbia, Canada) (editors)
A series of papers presented at a Stock Identification Workshop at the Biological Laboratory, U.S. Bureau of Commercial Fisheries, Seattle, Wash., April 8,1970. H. R. MacMillan Lectures in Fisheries, University of British Columbia, Vancouver 8, British Columbia, Canada (1972), 231 pp.

For several years many of the problems of management of Pacific salmon have posed underlying questions about the concept of stocks, the techniques for their identification, and the relative contributions of hereditary and environmental factors in the population biology of salmon. A stock identification workshop was held, April 8, 1970, where a series of papers was presented on the subject, at the Biological Laboratory, Bureau of Commercial Fisheries, now known as the National Marine Fisheries Service. The papers and authors are listed under the following subjects.

I. The Problem
"The Stock Concept and Management of Pacific Salmon" by P. A. Larkin;
II. The Present Knowledge
"Hereditary and Environmental Factors Affecting Certain Salmonid Populations" by W. E. Ricker (Fisheries Research Board of Canada, Biological Station, Nanaimo, B.C., Canada);
"Gene Frequency and the Stock Problem" by Raymond C. Simon;

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2.116 (2.114)(2.146) SUPPRESSING MARINE RADIO INTERFERENCE

Anonymous
Australian Fisheries 31, No. 5, 13-17 (May 1972)

There are many electronic devices on boats such as radiotelephones, direction finders, radar, sonar, and echo sounders. This equipment can generate unwanted radiofrequency energy by varying or interrupting the flow of current to them. In the normal operation of equipment, switches, thermostats, rheostats, ignition systems, and generator fields vary or interrupt the flow of current. Sometimes rotation of a propeller shaft generates interference. Interference is introduced into receivers by either conduction or radiation. Conducted interference flows through power lines or other wires to the receiver. Radiated interference is transmitted through space and is picked up by the receiver atenna system of the equipment.

Reduction of interference to a tolerable level can be achieved by three methods: by shielding or screening, by filtering out the noise signal, and by electrically bonding the equipment and shielding. Shielding uses a metal sheet or screen barrier around sensitive wires or components to reduce penetration by radiated energy. The shielding must be electrically bonded to a common ground so that unwanted radiofrequency energy can be conducted away. Filtering out interference is achieved by means of a capacitor and/or an inductor which confine the interference to a small nonradiating circuit. Interference from ignition systems can be suppressed by means of resistors and capacitors. (A diagram in the article shows how to suppress interference from this source.)

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1.3 (9.12)

III. Techniques for Future Studies
"Discrimination of Breeding Groups of the Muricid Snail Thais lamellosa Using Radioisotope X-Ray Spectrometry and Multivariate Discriminant Analysis" by John S. Stimson (Department of Zoology, University of Hawaii, Honolulu, Hawaii);
"Field Evaluation of Coded Wire Tag Detection and Recovery Techniques" by Earle D. Jewel and Robert C. Hager (State of Washington Department of Fisheries, Management and Research Division, Olympia, Wash.);
"Phosphoglucomutase and Esterase Polymorphism in Pacific Herring in Washington Waters" by Fred M. Utter (National Marine Fisheries Service, North Pacific Fisheries Research Center, Seattle, Wash.);
"Serological and Biochemical Studies in Racial Identification of Fishes" by Harold O. Hodgins (National Marine Fisheries Service, North Pacific Fisheries Research Center, Seattle, Wash.);
"Identification of Stocks of Pacific Salmon by Means of Scale Features" by Richard L. Major, Kenneth H. Mosher, and James E. Mason (National Marine Fisheries Service, North Pacific Fisheries Research Center, Seattle, Wash.). SW

1.3

a significant factor decreasing escapement rates into the major producing pink salmon systems. Emergency orders completely curtailed weekly fishing periods in certain portions of the area to allow escapement rates to increase. SW
[29 figures, 7 tables, 3 references]

3.4 SMOKING FLUID

Smoking fluid is produced by exposing finely divided wood to superheated steam. An oxygen-enriched atmosphere may be introduced with the superheated steam. FTP

2.116 (2.114) (2.146)

Electrical bonds are fixed connections between metal surfaces that result in low impedance connections. A bond ensures that radio currents cannot flow more easily in one part of a structure than in another. Corrosion of electrical bonds may render them ineffective. Precautions should be taken to prevent corrosion, and inspections must be made to locate faulty bonds so that corrective action may be taken. Sources of interference may be determined by switching on and off various pieces of equipment while listening to or watching receivers. The next step would be to decide the procedure to be followed in suppressing the interference. SW
[4 figures, 1 table]

2.118 DUNGENESS CRAB PODS

Hipkins, Fred W. (National Marine Fisheries Service, Northwest Fisheries Center, Seattle, WA 98102)
NMFS Extension Publication, Fishery Facts-3, 13 pp. (June 1972) (NOAA, National Marine Fisheries Service, U.S. Department of Commerce, Seattle, Wash.) Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Price $0.25.

This bulletin describes the design, construction, and use of pots for catching Dungeness crabs. FTP
[10 figures, 8 references]

2.3 THE APPLICATION OF CONTINUOUS CENTRIFUGATION TO SEAFOOD PROCESSING

Learson, R. J. (National Marine Fisheries Service, NOAA, Atlantic Fishery Products Technology Center, Emerson Ave., Gloucester, MA 01930), G. Reierstad (Bird Machine Co., South Walpole, MA 02071), and V. G. Ampola
Food Technology 26, No. 7, 32-34 (July 1972)

Experiments were carried out with a continuous decanting centrifuge using brine (15% salt solution) and designed primarily to separate crab meat from shell material. The equipment was applied to claw, leg, and body sections of six species of crab and to various fish and shellfish waste materials.
The shellfish or fish material is chopped or ground to a particle size of less than 3 cm. The mixture is fed into the centrifuge; the brine circulates continuously within the centrifuge system. The centrifuge is rotated at a selected rate within the range of from 200 to 800 r.p.m. During the rotation of the centrifuge bowl, a pool of brine 1-3 cm. deep is held on the outside of the bowl by the centrifugal force. The shellfish or fish material drops to the outside of the bowl and is removed by a screw conveyor. The shellfish or fish meat floats on the brine and is screened out at the exit port. The variables influencing the separation of meat and shell (or meat and bones) are the specific gravity of the brine, the rate of flow of the brine, the depth of the brine pool held on the outside of the rotating centrifuge bowl, and the speed (r.p.m.) of the centrifuge. The separation method appears applicable to recovery of meat from claw, leg, and body sections of various crabs, from the shucking waste (shell and meat) of the surf clam, from the cooked bodies and legs of lobster, and from the fillet frames of cod, haddock, and Atlantic ocean perch.
[2 figures, 3 tables, 3 references] FTP

2.9 MULTIPLE TOXINS IN CIGUATERA FISH SPECIES

Li, Kwan-Ming (Fac. Med., Univ. Hong Kong, Hong Kong)
Chemical Abstracts 76, No. 17, 95492t (Apr. 24, 1972)

3.4 SMOKING AGENTS

Fessman, G. (pat.)
British patent 1,229,925 (June 1971)
Food Technology 26, No. 6, 80 (June 1972)
Canadian patent 893,640 (pat.)
Fessman, G. (pat.)

3.11 NITRATES, NITRITES, AND NITROSAMINES

Wolff, I. A., and A. E. Wasserman (Eastern Regional Research Laboratory, Agricultural Research Service, U.S. Department of Agriculture, Philadelphia, PA 19118)
Science 177, No. 4043, 15-19 (July 7, 1972)

A comparison was made of the potential hazards of nitrite, nitrate, and nitrosamines in the environment. Most of the nitrates in the diet are from vegetables, domestic water supplies, and cured meats. The safe level of nitrates in potable water has been defined to be a maximum of 10 p.p.m. In the United States, nitrates are permitted as additives to meat at the level of 2-3/4 to 3-1/2 oz. per 100 lb. of meat. The nitrates ingested from these sources are rapidly excreted in urine. Under conditions in which they may be reduced to nitrites, nitrates are a potential hazard. Conditions in the digestive tracts of animals or humans may favor the growth of bacteria which can reduce nitrates to nitrites with subsequent toxicity to the host. Spinach or other vegetables stored under conditions favoring growth of microorganisms, or damp forage, may cause reduction of nitrates to nitrites with subsequent toxicity to the host--human or animal. Toxicity of nitrites is due to oxidation of iron in hemaglobin to form methemoglobin which is incapable of transporting oxygen to the tissues. Asphyxiation occurs when the concentration of methemoglobin exceeds 70%. The incidence of nitrite poisoning is quite low.

The source of most of the nitrites in the diet are cured meat and fish. The action of nitrites in the curing process provides an attractive red color, produces the cured flavor, and inhibits bacterial growth.

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3.337 (0.8) INTERNAL PRESSURE OF CANS AGITATED DURING HEATING AND COOLING

Adams, H. W., and W. Owen (FMC Corporation, Canning Machinery Division, Research Department, San Jose, CA 95108)
Food Technology 26, No. 7, 28-30 (July 1972)

Lighter weight cans are now being used for canning food products. Information on the internal pressures developed in such cans during processing are needed in order to design equipment and cans that would withstand various retort temperatures in continuous agitating equipment. Cans then can be designed for any particular product. In this study, the authors measured the internal temperatures and pressures developed during the continuous agitation processing of cans containing water, dog food, tomato juice, and a milk product. The items were processed in a pilot sterilizer called a steritort.

A unit consisting of a potentiometric pressure transducer (0-100 p.s.i.a.) enclosed in a plastic housing which contained a telemetry transmitter and battery was used. This unit was connected to the can containing the food product, and the can, with the attached unit, was processed in the steritort. The transducer measured the pressure and the thermistor was used to measure temperature. The telemetry system included a temperature-sensing probe (thermistor), a miniature radio, transmitter, receiver, digital temperature display, and a recorder. The temperature and pressure information was transmitted from the can to a receiving antenna and then to a receiver. No thermocouple wires were employed.

Pressure and temperature curves for the various canned products processed in the steritort are given. The pressure developed in a can of the given process

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4.13 (4.80) WAX ESTERS OF BARRACUDINA LIPID: A POTENTIAL REPLACEMENT FOR SPERM WHALE OIL

Ackman, R. G., S. N. Hooper, S. Epstein, and M. Kelleher (Fisheries Research Board of Canada, Halifax Laboratory, Halifax, Nova Scotia, Canada)
Journal of the American Oil Chemists' Society 49, No. 6, 378-382 (June 1972)

Exploratory fishing operations off Nova Scotia, Canada, brought up substantial quantities of the white barracudina (Paralepis rissoi krøyeri Bonaparte 1840). The lipid of these fish contained a relatively high proportion of wax esters. Because the extent of this resource appears to be large, it was considered that the commercially processed oil from these fish might be suitable as a substitute for the oil from the sperm whale (Physeter catodon). This report gives data on the lipids of the barracudina as a basis for commercial evaluation of and to stimulate interest in this resource.

The body (dressed fish) contained 17.7% lipid, 10% of which consisted of triglyceride and 85% of wax ester. The triglycerides had a calculated iodine value of 48 and were unusually rich in the following fatty acids: 14:0 (25.8%), 18:0 (4.3%), 20:0 (1.19%), 22:0 (0.45%), and 24:0 (0.75%). The wax ester fatty acids had a calculated iodine value of 126 and showed a fatty acid composition "normal" to marine oils. The wax ester fatty alcohols showed 42.2% hexadecanol, 29.5% octadecenols, 8.2% eicosenols, and 3.8% docosenols.

Oil from sperm whales is not permitted entry into the United States, because this mammal is considered an endangered species. The use of barracudina lipid as a substitute for sperm whale oil may be possible in some applications--the authors compare the composition of the oils relative to their commercial uses. The table

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4.6 (0.7) COMPARISONS OF BHT AND ETHOXYQUIN AS ANTIOXIDANTS IN THE NUTRITION OF BROILERS

Bartov, I., and S. Bornstein (Division of Poultry Science, The Volcani Institute of Agricultural Research, Bet Dagan, Israel)
Poultry Science 51, No. 3, 859-868 (May 1972)

Ethoxyquin (1,2-di-hydro-6-ethoxy-2,2,4-trimethylquinoline) and BHT (butylated hydroxytoluene) are used in feeds and feedstuffs to prevent oxidation of vitamin A, carotene, and fat. Ethoxyquin (EQ) is generally used in the local poultry rations. This study, consisting of three trials, compared the effects of EQ and BHT under different conditions of formulation and storage of feeds. Trial 1 compared the effects of EQ and BHT when added to practical-type diets containing either fresh or oxidized safflower oil, with or without supplementary α-to-copheryl acetate (ATA). Trial 2 compared the relative efficiency of EQ and BHT in protecting chicks against encephalomalacia. Trial 3 compared the efficiency of EQ and BHT in protecting some lipid components of diets that were stored for a relatively long period under severe conditions, and included observations on the effects on the performance of chicks fed these treated and stored diets. White Rock male chicks were used.

EQ and BHT, when added at a level of 125 mg./kg. of feed, protected with equal effectiveness the lipids in practical-type and semipurified diets held for 27 weeks at temperatures that ranged from 18° C. to 26° C. EQ and BHT, when added to the diets, acted similarly in improving the body weights of the chicks, the feed/gain ratio, and vitamin A level in the liver; this was true only when the test conditions were such as to lead to the deterioration of the unprotected

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3.337 (0.8)

temperature is influenced by can closing temperature, can closing pressure, volume of fill, dimensions of the can, the noncondensable gases in the product, the non-condensable gases generated during the process, and the configuration of the ends of the cans. Theoretical calculations for a particular product are difficult; therefore, direct pressure measurements are desirable.
[7 figures, 3 references] FTP

4.6 (0.7)

diets. Both antioxidants, when added to the diets, increased the accumulation of xanthophylls in the livers of the chicks. The diet containing EQ improved significantly the stability of the lipids of the liver (as measured by TBA values) as compared to the unsupplemented control diet; no significant difference was found between the diet containing EQ and that containing BHT. The stability of the lipids of the livers of the chicks was significantly improved by dietary ATA and adversely affected by the oxidized oil in the diet.

EQ, fed at levels of 80 and 120 mg./kg. in the diet, almost completely prevented encephalomalacia in chicks fed a semipurified diet low in vitamin E and containing oxidized safflower oil; BHT under the same conditions did not.

The authors concluded that neither of the antioxidants, when used in practical-type rations, showed a clear superiority over the other.
[2 figures, 5 tables, 27 references] FTP

4.5 INFLUENCE OF HERRING MICRO-ORGANISMS ON FAT OXIDATION.
(0.5) II. RESPIRATION OF LINOLEIC ACID HYPOPEROXIDES

Senser, F., and W. Grosch
Z. Lebensmitteluntersuch.-Forsch. 147, No. 4, 200-206 (1971) (In German, English summary)
BFMIRA Abstracts 25, No. 5, Abstract No. 1653, 336 (May 1972)

3.4 (SALMON) PROCESSING EFFECTS ON THE TEXTURE OF GOLDEYE (HIODON ALOSOIDES)

Lantz, A. W. et al.
Can. Inst. Fd Sci. Technol. J. 5, No. 1, 39-43 (1972)
BFMIRA Abstracts 25, No. 5, Abstract No. 1740, 354 (May 1972)

Sensory evaluation by ten judges showed hot-smoked (65°C) goldeye salmon to be soft and mealy as compared with cold-smoked (32°C) fish which was firmer and more flaky. Freezing prior to smoking was found to enhance moistness, firmness, flakiness and acceptability, but not to overcome the textural disadvantages in the case of hot smoking. Acidification of the brine prior to smoking increased moistness and softness but had no effect on acceptability. S.M.S. Reprinted

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3.11

In addition to being potentially toxic, nitrites are considered a potential reactant precursor for nitrosamines. Certain marine fish contain large quantities of trimethylamine, trimethylamine oxide, and dimethylamine which may react with nitrites to form N-nitrosodimethylamine.

Studies (reported elsewhere) in animals indicated that N-nitrosamines and the related N-nitrosamides are carcinogenic, and they may be mutagenic and teratogenic. The results of studies suggest that these compounds would be carcinogenic in man. Although nitrosamine formation occurs readily in vitro, in the normal, healthy human, gastric conditions do not seem to favor nitrosamine formation. Other environmental factors are potential sources of nitrosamines. Tobacco plants are rich in amines which have also been found in tobacco smoke.

Commonly used drugs taken either in large doses or for long periods contain secondary amines or amine precursors. Reacting nitrite with oxytetracycline and antipyrine yielded N-nitrosodimethylamine. Extended studies are needed before conclusions can be drawn. The extent of real danger is not yet known, but the available information suggests that there is no cause for alarm. Nitrites and nitrosamines should continue to be regarded as possible important toxicants, but action relative to modification of the food supply should be taken cautiously until additional information defines the problems more clearly.
[60 references] SW

4.13 (4.80)

that follows shows the amounts of important components of wax esters of barracudina body oil and sperm whale body and head oils.

Wax ester	Fatty acids composition of:			Fatty alcohols composition of:		
	Barracudina body oil	Sperm whale body oil	Sperm whale head oil	Barracudina body oil	Sperm whale body oil	Sperm whale head oil
14:0	6.2	3.3	14.4	3.8	3.2	11.0
14:1	0.3	2.4	33.3	--	--	--
16:0	6.3	8.1	2.8	40.2	24.9	49.7
16:1	15.7	26.9	9.5	0.5	9.6	4.4
18:0	0.4	1.1	0.2	7.0	4.3	3.5
18:1	34.2	33.3	4.9	29.6	44.9	27.3
20:1	4.3	10.9	0.9	8.3	5.0	0.5
20:5ω3	8.5	1.7	--	--	0.3	Trace
22:1	5.3	2.2	--	5.5	0.2	--
22:5ω3	0.4	0.8	0.2	--	0.6	Trace
22:6ω3	8.9	2.1	0.3	--	--	--

[2 figures, 2 tables, 33 references] FTP

4.13 EVALUATION OF ROSEFISH OIL IN COMPARISON
(4.15) WITH COD-LIVER OIL

Bilek, Donata, and Jozef Jeske (Inst. Lekow, Warsaw, Poland)
Chemical Abstracts 76, No. 19, 110508y (May 8, 1972)

6.3 (6.36) SEAWEEDS AND THEIR USES IN JAPAN. A REVIEW

Okazaki, Akio (editor)
Published by the Tokai University Press, Tokai Building, Shinjuku-ku, Tokyo, Japan (1971), 165 pp. Price $10.00. (In English)

About 30,000 to 40,000 tons of seaweed are produced annually from sources along the coasts of Japan. This yield of seaweed is then supplied to the markets for food and for raw material for industry. This work is a survey of seaweed as it is used in Japan. It covers taxonomy, detailed uses of each species, propagation and culture, harvesting, history, names of companies in the business, statistics of production, chemical analyses, manufacturing processes, and geographical location of beds along the coasts for each species.

The survey is subdivided into the following subjects.

Seaweeds and their distribution in Japan, seaweed production in Japan, survey of culture and use, value of seaweeds as shellfish feed, and as a shelter for fish eggs and spawn.

Species of Laminaria and their distribution, harvesting, kinds of processes used in preparation, uses, economic importance, and export. These seaweeds are used as food and as seasonings.

Species and distribution of Undaria, harvesting and production, propagation, and culture. These seaweeds are a popular food in Japan; accordingly, they are grown naturally and also cultured on rafts.

(over)

6.3 A SIMPLE METHOD FOR PRESERVING BLUE-GREEN ALGAE

De Halperin, Delia R. (CIBIMA, Libertad 1235, Buenos Aires, Argentina)
Boletin de la Sociedad Argentina de Botánica 13, No. 1, 42-44 (Mar. 1970)
Contribución Técnica No. 7 (n.d.), Centro de Investigación de Biología Marine, Libertad 1235, Buenos Aires, Argentina) (In Spanish; English summary)

Blue-green algae were kept alive for 6 years in test tubes on sterile vermiculite soaked in nutritive medium and held under suitable light conditions. The algae species consisted of Microcoleus vaginatus (Vaucher) Gomont (Oscillatoriaceae), Anabena variabilis (Kutzing) Bornet et Flahault and Nostoc muscorum Agardh (Nostocaceae), Microchaete diplosiphon Gomont and Scytonema hofmannii Agardh (Scytonemataceae), and Calothrix parietina (Nageli) Thuret (Rivulariaceae). [8 references] FTP

6.37 CANNED PINEAPPLE

Chlorella Ind. Co. Ltd. (pat.)
Japanese Patent 42932/71
Food Technology 26, No. 5, 116 (May 1972)

Chlorella and yeast extracts are used to suppress the acidlike taste of canned pineapple products. FTP

6.54 DEVELOPMENT OF A PROCESS FOR PREPARING A FISH PROTEIN CONCENTRATE WHICH CAN BE RECONSTITUTED INTO A MEAT-LIKE PRODUCT

Hyder, Kamaluddin, and Bryant F. Cobb, III (Department of Animal Science, Texas A&M University)
Sea Grant Publication No. TAMU-SG-72-201, viii + 93 pp. (Mar. 1972) (Texas A&M University, Sea Grant Program, College Station, TX 77840)

A process for preparing fish protein concentrate (FPC) with rehydration and emulsifying properties is described. Micropogon undulatus, which is discarded during shrimping operations in the Gulf of Mexico, is used as a starting material. Theoretical aspects of maintaining functional properties in hot solvent extracted proteins are discussed. The rehydration and emulsifying capacities of fish protein are maintained by pH adjustment to prevent protein-protein interaction during hot solvent extraction processes.

The process for preparing FPC from 100 g of fish muscle consists of the following steps: (1) comminution with 5 g of NaCl, (2) adjustment of pH to 2.5 with 1N HCl, (3) extraction of lipids with 400 ml of 1:1 mixture of 95 percent ethanol and hexane by refluxing at 70° C for 30 minutes, (4) removal of solvents by filtration or centrifugation, (5) repetition of the steps 3 and 4 until most of the lipids are removed, and (6) drying of FPC below 70°C in air or vacuum.

The FPC produced by this method has the following qualities: (1) amino acid spectrum similar to that of the fish muscle, (2) bacteriologically sterile, (3) water retention capacity at least twice the capacity of the original fish muscle, (4) forms emulsions in oil-water mixtures, (5) has high protein efficiency ratio,

(over)

7.8 ORGANOLEPTIC TECHNIQUE PREDICTS REFRIGERATION SHELF LIFE OF FISH

Charm, S. E., R. J. Learson, L. J. Ronsivalli, and M. Schwartz (National Marine Fisheries Service, NOAA, Atlantic Fishery Products Technology Center, Emerson Ave., Gloucester, MA 01930)
Food Technology 26, No. 7, 65-68 (July 1972)

A trained panel by experience learned to express the storage quality of cod fillets in terms of the estimated number of days in 1° C. refrigerated storage. Odor was used as the primary indicator of quality. Then, the panel determined the rate of spoilage of cod fillets (quality was expressed in terms of estimated number of days in 1° C. refrigerated storage) stored at various constant temperatures (1°, 4°, 6°, and 8° C.). The cod spoiled at a constant rate when stored at constant refrigerated temperatures. From these results, the authors developed a simple graphical method for estimating the shelf life of cod fillets for any given storage condition or set of storage conditions. The figure that follows shows the graphical method for predicting the quality of cod fillets stored under a given set of storage conditions.

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6.33 EFFECTS OF POLYPHOSPHATES ON EXTRACTABILITY OF AGAR IN THE COOKING PROCESS OF SEAWEEDS. I. RELATIONSHIP BETWEEN VARIETY OF POLYPHOSPHATES AND EXTRACTABILITY OF AGAR

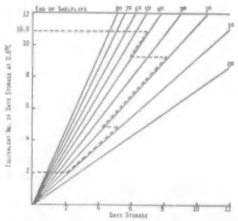
Matsuhashi, T.
Bull. Jap. Soc. scient. Fish. 37, No. 5, 441-448 (1971)
BFMIRA Abstracts 25, No. 2, Abstract No. 537, 112 (Feb. 1972)

Ten different kinds of phosphates were used in experiments with Gelidium pacificum Okamura and Gracilaria verrucosa (Hudson) Papenfuss. The processing of the seaweeds and the analysis and measurements of agar and agar gel are described in detail. In general it was found that the effect of polyphosphate on agar extraction becomes greater with increasing degree of condensation of phosphate. L.P.

II. EFFECTS OF CONCENTRATION OF POLYPHOSPHATES AND COOKING PERIOD ON EXTRACTABILITY OF AGAR AND GEL PROPERTIES ibid. 449-454.

In this second part the effects of different concentrations of sodium hexametaphosphate and sodium tripolyphosphate on agar extraction were studied and the results given graphically. Gel properties and yield were also determined and the results showed that sulphuric acid could be replaced advantageously by polyphosphates in the agar extraction process. L.P. Reprinted

7.8



Method for estimating the final quality of cod fillets stored under specified storage conditions.

Note: (1) Initial storage of cod fillets was 2 days in ice followed by 3 days at 1° C., 4 days at 2° C., and 1 day at 5° C.
(2) Solid lines represent spoilage rates at constant temperatures. Horizontal dotted lines represent changes in storage temperature. Diagonal dotted lines represent number of days the cod fillets held at the indicated temperature.

[4 figures, 2 tables, 6 references] FTP

6.3 (6.36)

History of purple Porphyra industry, method of culture, processing, production, uses, and commercial value. Purple Porphyra is rich in food values and high in commercial value. The areas on the coast, where it provides a livelihood for gatherers, are deteriorating due to industrial pollution.
The alginate industry uses the genera Eisenia, Ecklonia, and Laminaria unfit for human food. Other subjects covered are manufacture of alginate, and propylene glycol ester of alginic acid, industrial uses, and inspection methods.
The red seaweed Gloiopeltis is used in the production of carrageenan, textile sizing, drugs, binding material, cosmetics, and pigments.
Seaweeds used for production of agar-agar, methods of manufacture, uses, economics, and inspection methods. Many genera of seaweed are used to make agar-agar. It is used in foods, candy, food preservation, medicine, dentistry, and microbiology.
Seaweed in cattle and poultry feed and as a fertilizer. Genera used are Ecklonia, Eisenia, and Sargassum. SW

6.54

(6) appears to be useful as a binder protein in sausage-like products, and (7) forms milk-like suspensions. A partially refined fish oil is produced as a co-product.
The process removes Pb, Cd, and As from fish muscle but not Hg. The Hg in FPC is rapidly incorporated into and retained by the blood, kidneys, and livers of rats.
[16 figures, 15 tables, 100 references] Authors' abstract

6.35 BIOLOGICAL PROPERTIES OF CARRAGEENAN

Di Rosa, M.
J. Pharm. Pharmac. 24, No. 2, 89-102 (1972)
BFMIRA Abstracts 25, No. 6, Abstract No. 2062, 417 (June 1972)

This is a comprehensive review which contains a small section on the absorption, fate and toxicological studies of orally administered carrageenan. There is a reference list of some 100 items. L.P. Reprinted

6.54 (2.3) FISH PROTEIN RECOVERY

Nippon Suisan Co. Ltd. (pat.)
Japanese Patent 1633/72
Food Technology 26, No. 6, 76 (June 1972)

Chitosan is used as a coagulant to recover protein from colloidal suspension of fish meat. FTP

9.10 (1.9) ECOLOGICAL ASPECTS OF PLANKTON PRODUCTION

Subbaraju, R. C., and K. Krishnamurthy (Centre of Advanced Study in Marine Biology, Annamalai University, Porto Novo, Tamilnadu, India)
Marine Biology 14, No. 1, 25-31 (May 1972)

Plankton is basic in the economy of the sea. The ecology of plankton was studied at Porto Novo, India. Plankton was collected from nearshore and estuarine waters of Porto Novo from January 1960 to December 1967. Oblique, horizontal, and vertical hauls were made at 5, 10, and 20 fathoms. The nets were made of bolting silk Nos. 10 and 20 depending on availability. The retention rate of No. 10 was 50.50% that of No. 20. Generally 3 to 5 cubic meters of water were sampled and collections were made frequently (daily or on alternate days). On occasion, because of weather, collections would be made less frequently.

Maximum plankton productivity occurred during February/March to October/November. The dominant species were diatoms, copepods, and in some months dinoflagellates. Noctiluca was dominant during August and showed two or three growth increases per year. The major component of zooplankton consisted of copepods (80 to 95% of the population).

A comparison, from the literature, made of zooplankton density in average numbers per cubic meter of water at various locations follows: using the No. 10 net--Porto Novo, (copepods only) 42,000; Block Island Sound and Long Island Sound, 48,000 and 61,000, respectively; Southampton, England, up to 32,000 and using the No. 25 net--Plymouth, England, 30,000; Kiel Bay, Germany, 142,846 (eggs included).

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9.12 THE APPLICATION OF HYDROACOUSTIC METHODS FOR AQUATIC BIOMASS MEASUREMENTS. A NOTE ON ECHO ENVELOPE SAMPLING AND INTEGRATION

Lozow, Jeffrey B., and John B. Suomala (Charles Stark Draper Laboratory, Massachusetts Institute of Technology, Cambridge, MA 02139)
Report No. MITSG 72-8, Massachusetts Institute of Technology, Sea Grant Project, Cambridge, MA 02139 (March 1, 1972), vii + 55 + 37 pp.

A detailed analysis of basic fish abundance estimation techniques and their respective errors is presented. (No attempt is made to include hardware implementation in this note.) Echo sampling and integration schemes approach unbiased population estimates if the following details are known: a) the average target strength of the aggregation, b) the approximate "shape" or geometry of the fish aggregation, and c) the transducer directivity function, source level, voltage response, etc. It is shown that unbiased estimates of dense populations demand a priori knowledge of the geometry and distribution of the randomly assembled targets with respect to the transducer's effective volume coverage. Two typical geometries are examined; they may be loosely described as 1) thick layer of infinite expanse, and 2) thin layer of infinite expanse. The effect of the random phase components on the variance of the population estimate is demonstrated and the autocorrelation of the echo intensity is given.
[17 figures, 4 references, 6 appendices] Authors' abstract

9.15 SOME ASPECTS OF PATHOGENESIS OF INFECTIOUS HEMATOPOIETIC NECROSIS (IHN)

Yasutake, William T., and Donald F. Amend (Bureau of Sport Fisheries and Wildlife, Western Fish Disease Laboratory, Seattle, WA 98115)
Journal of Fish Biology 4, No. 2, 261-264 (Apr. 1972)

In earlier work, infectious hematopoietic necrosis (IHN) was first isolated in 1967 from rainbow trout (Salmo gairdneri) and sockeye salmon (Oncorhynchus nerka) from British Columbia. The morphological characteristics of IHN virus and its similarities to viruses responsible for disease in sockeye and chinook salmon (O. tshawytscha) known as Oregon sockeye disease (OSD) and Sacramento River chinook disease (SRCD), were described in later work. Other workers found that histopathological manifestations observed in naturally occurring IHN were similar to those described in OSD and SRCD epidemics and experimental infections in sockeye.

To determine if significant pathological differences exist among the three diseases, especially in the early stages of infection, the histopathogenesis of IHN in juvenile sockeye salmon under controlled conditions was investigated. Juvenile sockeye salmon were exposed, by adding IHN virus to the water in which they were held, then transferred to troughs of free flowing uncontaminated water. Fish samples were taken every 24 hr. for histological examination and virus-concentration determinations. Virus was detected in the fish at the end of 24 hr. The most significant histopathological changes occurred 4 days after exposure, hematopoetic tissue of the kidney being the most extensively involved. Variable degenerative changes were seen in the liver, pancreas, and in granular cells of the digestive tract. On the 4th day, maximum tissue concentration of virus was reached. On the 6th day, 30% of the fish were dead.

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9.15 CONTROL OF UNICELLULAR PARASITES USING FORMALIN

Lahav, M., and S. Sarig (Laboratory for Fish Diseases, Nir David, Israel)
Bamidgeh 24, No. 1, 3-11 (Mar. 1972)

Cases of fish mortalities due to infections with the unicellular (protozoan) parasites Chilodonella sp. and Costia sp. had increased in Israel during the past years. These cases were also associated with the incidence of high numbers of Trichodina sp. The regular line of pesticides commonly used in fish farms against copepod parasites were not effective against the protozoan parasites. The authors, therefore, carried out tests to determine the possible use of low concentrations of formalin for the control of these parasites. The tests were designed to provide the following information: (1) the sensitivity of carp, tilapia, and gray mullet to various concentrations of formalin, (2) the effect of temperature on the toxicity of the formalin to the fishes, (3) the effect of the salinity of the water on the sensitivity of the fishes to formalin, and (4) the concentration level of formalin effective against the unicellular parasites during different time periods.

Formalin, applied to the entire fish population in a pond at a level of 30-40 p.p.m. will eradicate the unicellular parasites Chilodonella sp., Costia sp., and Trichodina sp. The fishes became free of parasites within 6 hr. after the beginning of the formalin treatment. When carp were exposed for 24 hr. to formalin concentrations three to four times that recommended (30-40 p.p.m.) to eradicate parasites, about 70% of the carp were adversely affected; tilapia and mullet were similarly sensitive to formalin. The toxicity of formalin to carp increased at higher temperatures (temperatures used were 15°, 20°, and 30° C.) The salinity

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9.14
(4.91)

UNSATURATED FATTY ACIDS IN TROUT DIETS

Anonymous
Nutrition Reviews 30, No. 6, 144-147 (June 1972)

In recent years, study of the nutritional requirements of fish has received more attention because of the greater use of formulated diets in raising fish in hatcheries, as well as from the standpoint of comparative nutritional requirements of different species. It is well known that the composition of fish lipids differs significantly from that of mammalian lipids [Nutrition Reviews 21, 57 (1963)], and the predominant unsaturated fatty acids occurring naturally are those of the linolenate series (9,12, 15-octadecatrienoic acid or C18:3ω3), rather than those of the linoleate (9,12-octadecadienoic acid or C18:3ω6) series.

Linolenic acid and fatty acids of the linolenic series appear to be the essential fatty acids in the nutrition of the trout (Salmo gairdneri), whereas fatty acids of the linoleic series are not essential. Some of the symptoms of linoleate deficiency observed are similar to several conditions reported in trout raised on commercial diets, which previously have been rich in linoleic acid and low in linolenic acid.

These results [of the work described in the literature and reviewed here] show clearly that linolenate series fatty acids are essential in the diet of the trout, and presumably of other fish, although linoleate can exert a "sparing" effect. This is the reverse of the situation in species, including humans, in which linoleate series fatty acids are the primary essential fatty acid, at least with respect to growth and reproduction, with a "sparing" effect being exerted by linolenate. The reason for the greater efficacy of the linolenate series fatty acids in fish remains an intriguing problem still to be solved. [14 references]

[Quoted from Nutrition Reviews]

9.15

of the water had no effect on the sensitivity of the fishes to formalin (salinity was varied from 50 to 1,000 mg. Cl⁻/l.).

Three problems may develop in the use of formalin in pond water treatment. These are (1) large volumes of a highly toxic chemical must be used and evenly distributed within the pond water. (2) Some phytoplankton and zooplankton are destroyed and may create an oxygen deficit in the pond. (3) The productivity of the pond may be reduced through use of the chemical. These problems can be overcome by (1) lowering the pond level to reduce the amount of chemical required and (2) applying the formalin early in the morning so that fresh water can be added 6-8 hr. afterwards, before nightfall.
[1 figure, 3 tables, 13 references]

FTP

9.10 (1.9)

The authors suggest that numerical abundance of plankton coincides with high salinity values between April and September. Salinity values ranged between 20 and 30 ‰. Short term peaks of phytoplankton and copepod also occurred from February/March to November. The fishing activity in local waters was found to be more intensive during this period and total yield of fish catches was greatest when copepods were most abundant.
[4 figures, 4 tables, 42 references]

SW

9.12
(9.16)

GENETICS, SELECTION, AND HYBRIDIZATION OF FISH

Cherfas, B. I. (editor) (Academy of Sciences of the USSR, Ministry of Fisheries of the USSR)
Ichthyological Commission Ministry of Fisheries of the RSFSR, Government Scientific Research Institute of Lake and River Fisheries. 1969
Translated from the Russian and published for the National Marine Fisheries Service and the National Science Foundation, Washington, D.C., by the Israel Program for Scientific Translations, 266 pp. (1972). Available from the U.S. Department of Commerce, National Technical Information Service, Springfield, VA 22151. IPST Cat. No. 600424.

This publication is a collection of some papers delivered at the first All-Union Conference on Genetics, Selection, and Hybridization of Fish held in Leningrad, in 1967. Most of the papers delivered were related to carp with a few exceptions. The subject of one of these exceptions is on the Pacific salmon (p.131), and the subject of another is the variability and past history of rainbow trout (p. 221). The sturgeon and its hybrids are the subject of several papers.

The major subtopics in the collection are as follows: Genetics, heredity, and variability of fish cytology; Hybridization of fish; and Selection of fish.

SW

9.12
(1.89)

STUDIES ON JAPANESE COMMON SQUID (TODARODES PACIFICUS STEENSTRUP)

Anonymous
Bulletin No. 57, Technical Council for Agriculture & Fisheries (Norin-Suisan Gijutsu Kaigi, Tokyo, Japan) (March 1972), 246 pp. (In Japanese)

This bulletin reports on a study of the reasons for the fluctuations in catch of the Japanese common squid. The various chapters deal with spawning and reproduction, distribution and migration, subpopulation aspects, and forecasting.

FTP

9.15

Histopathologically, tissue changes caused by IHN were similar to those caused by SRCD and OSD, with minor differences in the sequence of changes. The authors suggest that IHN, SRCD, and OSD viruses are similar in most respects and probably closely related.
[1 figure, 4 plates, 13 references]

SW

9.15
(0.5)

DETECTION OF ANTIBODIES TO AEROMONAS LIQUEFACIENS IN FISH BY AN INDIRECT FLUORESCENT ANTIBODY TECHNIQUE

Lewis, D. H., and N. L. Savage (Department of Veterinary Microbiology, Texas A&M University, College Station, TX 77843, U.S.A.)
Journal of the Fisheries Research Board of Canada 29, No. 2, 211-212 (Feb. 1972)

A technique for detecting antibodies in fish is described. It is based on the reaction between fluorescein-labeled antifish globulin and a fish antibody-antigen complex. The procedure is useful in screening fish for various disease agents.

FTP

[1 table, 5 references]

9.15 (9.19) THE EFFECTS OF METHOXYCHLOR ON FISHES. I. ACUTE TOXICITY AND BREAKDOWN STUDIES

Merna, James W. (Institute for Fisheries Research, Michigan Department of Natural Resources, Ann Arbor, Michigan), Michael E. Bender (Virginia Institute of Marine Science, Gloucester Point, VA 23062), and James R. Novy (Water Resources Commission Inland Lakes Study, Houghton Lake, MI 48629)
Transactions of the American Fisheries Society 101, No. 2, 298-301 (Apr. 1972)

Since the ban or restricted use of DDT is in effect, methoxychlor is recommended as a substitute for control of such problems as Dutch elm disease. Substitution of methoxychlor was recommended in previous work because (1) potency against many insects is similar to DDT; (2) cost is less than many phosphate-containing insecticides; (3) metabolism by warmblooded animals is rapid. Other reports indicated that it was biodegradable in the environment and was stored in fish tissue at much lower levels than DDT.

Because of the possibility of increased use of methoxychlor, experiments were conducted to determine: (1) residual life in various aquatic environments and (2) tolerance levels (TL) in two species of fish-- the fathead minnow (Pimephales promelas) and the yellow perch (Perca flavescens). The quality of water, that is, pH, amount of alkaline salts, and hardness in relation to biodegradability, was also investigated. A variety of test waters were used: distilled water at pH 7 and 9; water from Koch Warner Creek at Saline, Mich.; aged Ann Arbor tap water which had previously held fish; and water from Third Sister Lake containing plankton. The stock solution of methoxychlor contained ethanol and Triton X-100 to assure solution in the waters.

(over)

9.16 (0.5) BACTERIAL POPULATION OF DIETS FOR AQUARIUM FISHES

Trust, T. J., and Vida G. Money (Department of Bacteriology and Biochemistry, University of Victoria, Victoria, British Columbia, Canada)
Journal of the Fisheries Research Board of Canada 29, No. 4, 429-433 (Apr. 1972)

Aquarium fishes are often used in certain areas of biological research. Feeds especially designed for such fish have been developed and are offered commercially. In this study, the microbial burden of 25 of such commercially-formulated diets was determined.

One feed was sterile. The bacterial load on the remaining 24 was as shown in the table that follows.

Species of the genus Bacillus were the most numerous. Species of Clostridium (including C. perfringens), enterococci, and members of the Enterobacteriaceae were present in significant numbers. Apparently these aquarium fish feeds supported the growth of a wide variety of bacteria that are known to be pathogenic to fish and to man. Research workers should be aware of the presence of a variety of bacterial species in aquarium fish diets; these bacteria can affect the fishand the fishes' environment and thereby influence the results of any experiments.

(over)

9.16 (1.0146) OYSTERS AND TROUT FROM SCOTTISH FISH FARMS

Hjul, Peter
Fishing News, No. 3078, 6-7 (June 23, 1972)

A project to breed and raise oysters is located on Loch Creran near the west coast port of Oban in northern Scotland. The Highlands and Islands Development Board assisted the company in association with other investors. The Pacific oyster (Crassostrea gigas) was selected for rearing because it is fast growing and large. It will not breed in the colder waters surrounding the British Isles; however, it will grow in these waters when past the "eye" stage in the hatchery tanks.

The process starts with the hatchery's own brood stock kept at a temperature of 20° C. in heated, raw sea water from Loch Creran. When eggs are required, spawning is stimulated by the heat shock method (in which water surrounding the oysters is heated to about 34° C.) or by pouring an extract of minced gonads over oysters. Six hours after spawning, the fertilized egg becomes a well developed embryo. The developed embryos are separated from undeveloped eggs by passing through sieves: about 1 to 2% of the millions of eggs released survive. The developing eggs are kept in 100-gal. polythene drums. In 2 to 3 weeks the eye spot appears indicating metamorphosis is complete, the eggs having changed into young oysters. These settle on PVC sheets in the tanks. After 24 hr., the sheets are removed and the seed oysters or spat are transferred to fine mesh trays held in fiberglass tanks. The spat are held in these trays for 3 to 4 weeks and are fed plankton-enriched sea water. They are then moved to shallow concrete tanks containing warmed, unfiltered sea water. The temperature of the sea water is gradually reduced to that of the loch. The spat are placed in trays and installed in

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9.16 (1.37)(9.19) STEELHEAD MIGRATION: POTENTIAL TEMPERATURE EFFECTS AS INDICATED BY GILL ADENOSINE TRIPHOSPHATASE ACTIVITIES

Zaugg, W. S., B. L. Adams, and L. R. McLain (Western Fish Nutrition Laboratory, Bureau of Sport Fisheries and Wildlife, Cook, WA 98605)
Science 176, No. 4033, 415-416 (Apr. 28, 1972)

Proposed nuclear power plants are potential thermal polluters of the Columbia River and its tributaries. In this study the authors show that water temperatures higher than 12° C. may alter the migratory behavior and the physiological condition of steelhead trout (Salmo gairdneri). Steelhead propagate naturally in tributaries of the Columbia and are reared in State and Federal hatcheries. Just prior to seaward migration young fish known as parr undergo adaptive biochemical and physiological change and become migratory smolts. One of the biochemical changes is an increase in the sodium and potassium ion (Na^+, K^+) stimulated adenosine triphosphatase activity of gill microsomes. Size appears to be a major determinant in the parr-smolt transformation. Yearling parr that fail to reach the necessary size when the migratory season arrives remain in fresh water until the following spring. However, smolts ready to migrate seaward but held in fresh water revert to parr. Reversion is accompanied by a decrease in the elevated adenosine triphosphatase activity and loss of ability to adapt to sea water. To determine the relation of adenosine triphosphatase activity to temperature, yearling steelhead trout were held in water at various temperatures during the migratory season (March to June).

The Na^+ and K^+ stimulated adenosine triphosphatase activity in steelhead held at 6.5° C. increased during parr to smolt transformation. When these fish were

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9.16 (1.0146)

galvanized tubular cages submerged in Loch Creran. There the oysters grow to market size in natural sea water protected from predators. Throughout the time that the oysters remain in the tanks, they are fed phytoplankton grown at the hatchery.

Another project supported by the Highlands and Islands Development Board is a fresh-water trout farm using the American-developed raceway method. The rainbow trout rearing begins in a hatchery located along a clear mountain stream. Eggs are brought in from Denmark, Australia, or New Zealand depending on the season. The eggs are kept in plastic troughs in warmed stream water, where they are hatched in 3 weeks. When the fry swim up in the troughs, they begin feeding on the balanced commercial food "Beta." This food is used in various particle sizes through all the growth stages of the trout. The fry are then transferred to concrete tanks outside and remain for 3 months. From there they are transported over the road to the farm and kept in round tanks for a time. The trout are then transferred to the first raceway of the block of 42. Each raceway is 104 ft. long, 6 ft. wide and 1½ ft. deep. A block of raceways covers 16 acres.

Fresh water is pumped from a nearby lake to a channel connecting the raceways and allowed to flow through them. As they grow, the trout are moved from one raceway to the next until they are market size at the last raceway. Under these conditions the trout reach 1 lb. in 11 months. The system is efficient and productive and can be run by four men.
[7 photographs] SW

9.16 (1.37)(9.19)

transferred to 15° C. water, adenosine triphosphatase activity dropped sharply. Fish held at 15° C. exhibited no increase until they were transferred to 10° C. water where activity rose steadily.

To test adaptability to salt water, four fish held at 6.5° and 10° C. (increased adenosine phosphatase activity) and four fish held at 15° and 20° C. (low activity) were placed abruptly in artificial sea water at 12.5° C. All four of the fish held at 20° C. and three held at 15° C. died in 3 days. No mortalities occurred in groups held at lower temperatures.

The authors concluded that elevation of Na^+ and K^+ stimulated adenosine triphosphatase activity in gill microsomes is closely associated with parr to smolt metamorphosis and may be used as an index of migration preparedness. An observed decrease in this activity because of exposure to 15° C. water reflects a loss of ability to adapt to sea water. The Federal Water Pollution Control Administration suggested provisionally that a temperature of 20° C. (68° F.) was compatible with salmonids. The authors said that 68° F. is too high, and 10° and 15° C. (50° to 59° F.) are detrimental to parr-smolt metamorphosis. The limit they suggest should be no higher than 13° C.
[1 figure, 13 references] SW

9.16 INFLUENCE OF FATTY ALCOHOLS ON THE TEMPERATURE OF WATER IN CARP PONDS

Mann, H., E. Scherf, and M. Wassermann (Inst. Kuesten-Binnenfisch., Bundesforschungsanst. Fisch., Hamburg, Germany)
Chemical Abstracts 76, No. 22, 131337g (May 29, 1972)

9.15 (9.19)

The results indicate that pH had no effect on breakdown of methoxychlor after 220 days. In Ann Arbor tap water and Koch Warner Creek water the half life of methoxychlor was 8 and 7 days, respectively. A high initial rate of degradation of methoxychlor was attributed to its adsorption on particles which settled and were missed in sampling. Tests on filtered Third Sister Lake water indicated a half life of 7 days in one experiment and 18 days (by extrapolation) in a second experiment. Static bioassay tests with minnow and perch yielded TL_{50} of 7.5 µg./l. and 30.0 µg./l., respectively. Results were unreliable due to rapid breakdown of methoxychlor.

Continuous flow studies were run on minnows in Ann Arbor tap water and on perch in Koch Warner Creek water. The test with minnows confirmed the static test TL_{50}. In the continuous flow tests with perch, all fish died at methoxychlor concentrations of 40 µg./l., and six of eight died at a level of 20 µg./l. There were no deaths at lower levels. A TL_{50} of 20 µg./l. was indicated.

The results indicate that there may be a very narrow tolerance level below which perch are able to metabolize methoxychlor with no mortality.
[5 figures, 3 tables, 13 references] SW

9.15 COMBINATION OF METHYL MERCURY WITH THE PROTEIN OF EGG WHITE

Irukayama, Katsuro, and Shunsuke Kuwahara (Med. Sch., Kumamoto Univ., Kumamoto, Japan)
Chemical Abstracts 76, No. 19, 108831e (May 8, 1972)

9.16 (0.5)

Bacteria	Number of feed samples	Range of bacterial counts in the feeds
Aerobes	6	0.9 to 5 × 10^3/g.
	15	19 to 204 × 10^3/g.
	3	528 to 1,338 × 10^3/g.
Anaerobes	4	None detected
	17	0.7 to 39.2 × 10^3/g.
	3	117 to 244 × 10^3/g.
Enterobacteriaceae	1	None detected
	12	40 to 90 MPN/10 g.
	11	230 to 11,000 MPN/10 g.
Coliforms	7	None detected
	8	40 to 90 MPN/10 g.
	9	230 to 11,000 MPN/10 g.
Faecal coliforms	16	None detected
	3	40 to 90 MPN/10 g.
	5	150 to 500 MPN/10 g.
Enterococci	7	None detected
	4	40 to 90 MPN/10 g.
	13	230 to 110,000 MPN/10 g.
Clostridia	7	None detected
	1	90 MPN/10 g.
	16	230 to 110,000 MPN/10 g.

[1 table, 23 references] FTP

9.19 ENVIRONMENTAL IMPACT ANALYSIS: PHILOSOPHY & METHODS

Ditton, Robert B., and Thomas L. Goodale (editors)
Proceedings of the Conference on Environmental Impact Analysis, Green Bay, Wisconsin, January 4-5, 1972. Published by University of Wisconsin Sea Grant Program, 1225 West Dayton Street, Madison, WI 53706. 171 pp.

The National Environmental Policy Act of 1970 (NEPA) declares that public laws of the United States shall be interpreted and administered in accordance with newly emphasized goals of preventing and eliminating damage to the environment and biosphere, and to encourage harmony between man and his environment. The basic mechanism to carry out the spirit of NEPA is the environmental impact statement. This statement is required (by the law) to be prepared by the prime Federal agency whose actions will have a significant effect on the environment. The agency concerned must address itself to the following points: any adverse impacts which can not be avoided by the action; the alternative courses of action; the relation between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity; and a description of the irreversible and irretrievable commitment of resources which would occur. The impact statement must be circulated by the agency to all pertinent groups that could be interested, and no actions shall be taken for at least 30 days after the statement is made public.

Two years have elapsed since NEPA was passed. A conference was held to serve as a forum for the exchange of information among State and Federal agencies and educators on their experiences with NEPA. The exchanges were communicated in the form of papers delivered at the conference. The papers were segregated into the

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9.19 (6.133)(4.80) RESIDUES OF ORGANOCHLORINE PESTICIDES AND POLYCHLORINATED BIPHENYLS IN SOME COMMERCIALLY PRODUCED CANADIAN MARINE OILS

Addison, R. F., M. E. Zinck (Fisheries Research Board of Canada, Marine Ecology Laboratory, Bedford Institute, Dartmouth, Nova Scotia, Canada), and R. G. Ackman (Fisheries Research Board of Canada, Halifax Laboratory, P.O. Box 429, Halifax, Nova Scotia)
Journal of the Fisheries Research Board of Canada 29, No. 4, 349-355 (Apr. 1972)

Pesticide residues absorbed by plants and ingested by animals are concentrated in their depot fats. Many of such fats of marine animal origin are processed commercially and are consumed by animals and man. For example, herring, seal, and whale oils serve as the raw material for some fat products for human consumption. This article reports on a survey of the organochlorine residues in some marine oils produced commercially over the past 20 years from fish of the Gulf of St. Lawrence and the western North Atlantic Ocean. The purpose was to establish a range of values likely to be encountered in marine oils and to serve as a reference base in future studies. Data on some oils produced elsewhere from marine species were included.

Herring oils produced in the late 1960's from Gulf of St. Lawrence herring contained from 7 to 17 p.p.m. of DDT complex (p,p'DDE, p,p'DDD, p,p'DDT), about 0.1 p.p.m. of dieldrin, and up to 11 p.p.m. of PCBs. The oils produced in the spring showed higher residue levels than those produced in the autumn. Harp seal oils contained up to 8 p.p.m. of DDT complex, about 4 p.p.m. of PCBs, and no dieldrin. North Atlantic whale oils contained up to 44 p.p.m. of DDT complex; a

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9.19 POTENTIAL ENVIRONMENTAL EFFECTS OF AN OFFSHORE SUBMERGED NUCLEAR POWER PLANT

Anonymous
General Dynamics, Electric Boat Division, Groton, CT 06340. Vol. I and II, 29 pp. (June 1971). Prepared for Water Quality Research Office, Environmental Protection Agency, Contract No. 14-12-918. Available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Order No. EP2.10:16131OGF106/71; Price $2.25.

Potential environmental effects of wastes from an 1190-MWE pressurized water nuclear power plant, submerged 250 ft. deep at four representative sites off the U.S. mainland, were studied. The thermal field of the plant's cooling water discharge, and the distribution of radionuclides in the sea, were analyzed. In every case, the thermal "mixing zone" (by the most stringent present standards) was found to end before either a surface or subsurface field was established, and the zone was found to be much smaller than for a plant in shallower waters.

Fewer organisms would be killed by entrainment in the cooling water than at a coastal plant. A "batch" release of radionuclides, after the worst hypothetical nuclear accident, was calculated. The surrounding biota would be harmed; suspension of local fishing would be required for about 10 weeks. No potential ecological damage was predictable from the ordinary minute release of radionuclides, the thermal discharge, or other wastes. SW

9.19 (1.3) DETOXIFICATION OF KRAFT PULP MILL EFFLUENT BY AN AERATED LAGOON

Servizi, J. A., and R. W. Gordon
International Pacific Salmon Fisheries Commission Progress Report No. 26, 24 pp. (1972) (New Westminster, British Columbia, Canada)

A pulp and paper mill is located along the Thompson River, 3 miles upstream of Kamloops Lake in British Columbia. The Thompson River is part of the migration route to their native spawning grounds for more than a million sockeye salmon.

Millions of sockeye smolts move down stream in spring during their journey to the ocean. In addition, young sockeye fry move downstream past the mill to Kamloops Lake where they live for 1 year before departing for the ocean. The Thompson River downstream of Kamloops Lake supports a variety of salmonids and is the spawning ground for pink salmon. To protect water quality and the fisheries of the Thompson River system, mill effluent was required by the Canada Department of the Environment, Fisheries Service to meet certain standards including minimum biological oxygen demand (BOD) reductions of 60%. The standards required also, that young salmon survive an acute toxicity test consisting of 4 days' exposure to a mixture of 65 parts treated effluent and 35 parts river water.

Occasional substandard detoxification of the mill effluent during treatment in an aerated lagoon caused studies to be undertaken seeking the cause. Results of the study indicated that biological treatment in an aerated lagoon was generally capable of detoxifying kraft pulp mill effluent to meet standards, but with exceptions. Further, diversion of black liquor spills to the aerated lagoon often caused substandard detoxification. It was found that spills of black liquor should

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9.15 CARBOXYHEMOGLOBIN ELEVATION AFTER EXPOSURE TO DICHLOROMETHANE

Stewart, Richard D., Terrance N. Fisher, Michael J. Hosko, Jack E. Peterson, Edward D. Baretta, Hugh C. Dodd (Department of Environmental Medicine, Medical College of Wisconsin, Allen-Bradley Laboratory, 8700 West Wisconsin Ave., Milwaukee, WI 53226)
Science 176, No. 4032, 295-296 (Apr. 21, 1972)

Dichloromethane (or methylene chloride) is a widely used solvent and degreaser. Inhalation of dichloromethane vapor in concentrations of 500 to 1,000 p.p.m. caused formation of carbon monoxide after 1-2 hours' exposure in human subjects. [1 figure, 6 references] SW

9.19 (1.3)

be retained within the mill or in spill ponds for recycling or for slow release to the treatment system. In addition, effluents resulting from pulping of green Douglas fir or spruce chips were sometimes associated with substandard detoxification, but not always, and for no apparent reason. There was evidence that the residual toxicants might be highly resistant to biological treatment. Finally, kraft pulpmill pollution, in terms of BOD and acute toxicity, was lowered by improving chemical recovery, recycling contaminated water, and controlling spills of black liquor.
[3 figures, 8 tables, 7 references] SW

FTP

[3 tables, 4 references]

The products of the fatty-acid-polyglycolic-ester type seem to be of more practical importance.

Fourteen samples of special oil dispersing products were tested as to their toxicities to organisms found in the water. When used up to a concentration of 200 mg/l, the materials were not toxic to the organisms. Most of the products were, however, highly toxic to fish and marine mammals. Some of the products were found to be relatively nontoxic to crustaceans and algae.

Summary)

Archiv für Fischereiwissenschaft 23, No. 1, 64-87 (June 1972) (In German, English Summary)

Bock, K. J. and H. Mann (Institute for Coastal and Inland Fisheries, Federal Research Institute for Fisheries, Hamburg, Germany)

CONTROL OF OIL POLLUTION]

[TOXICOLOGICAL EVALUATION OF EMULSIFIERS USED IN THE BEKÄMPFUNG VON ÖLVERSCHMUTZUNGEN

9.19 TOXIKOLOGISCHE UNTERSUCHUNG VON EMULGATOREN FÜR DIE

9.19 (6.133)(4.80)

few samples contained about 7 p.p.m. of PCBs; none of the samples showed dieldrin residues. Several Antarctic whale oils produced around the year 1950 contained about 0.1 p.p.m. of DDT complex and showed no detectable PCBs.

The authors state that it seems reasonable to suppose (based on published results with vegetable oils) that the DDT group and dieldrin would be removed during processing of fish and marine mammal oils. However, the effect of processing on the PCBs was not known to the authors at the time of preparation of this report.
[1 figure, 3 tables, 27 references] FTP

9.19 THE SYNERGISTIC EFFECTS OF TEMPERATURE, SALINITY, AND MERCURY ON SURVIVAL AND METABOLISM OF THE ADULT FIDDLER CRAB, UCA PUGILATOR

Vernberg, Winona B., and John Vernberg (Belle W. Baruch Coastal Research Institute and Department of Biology, University of South Carolina, Columbia, SC 29208)
Fishery Bulletin 70, No. 2, 415-420 (Apr. 1972)

This study was undertaken to determine the effect of a sublethal concentration of mercury on the metabolism of adult male and female fiddler crabs, Uca pugilator (Bosc), maintained under optimum and stressful conditions of temperature and salinity, and the synergistic effects on survival of this species with sublethal concentration of mercury in combination with salinity and thermal stress. This species was selected because it is one of the more abundant and ecologically important species in an estuarine ecosystem.

Gill tissues of fiddler crab, Uca pugilator, were the major site of mercury concentration; lesser amounts accumulated in the hepatopancreas and green gland. Very small amounts were found in the carapace and muscle tissue. No significant differences in the amount of mercury in tissues of males and females were found.

A concentration of mercury sublethal to fiddler crabs under optimum conditions of temperature and salinity greatly reduced survival times when crabs were placed under conditions of temperature and salinity stress. Males were more susceptible to the synergistic effects of mercury in combination with environmental stress than were females.

Metabolic rates of male and female fiddler crabs were affected by prolonged exposure to mercury both under optimum environmental conditions and under temperature and salinity stress. Metabolic rates of males were more adversely affected than those of females.[6 figures, 7 references]

Authors' introduction in part and abstract

9.19

following general topics: (1) The impact of the National Environmental Policy Act; (2) Two years of labor and learning; (3) Other environmental impact perspectives; (4) Some impact assessment dimensions; (5) Environmental impact assessment; and (6) Concluding remarks. The appendices cover sections of the law (PL 91-190), questions and answers explaining impact statements, sources for impact statements, and sources for back issues of the recording of impact statements called "the 102 monitor."

SW

9.19 PESTICIDES '72. PART 1.

Johnson, Oscar (FMC Corporation, Middleport, NY 14105)
Chemical Week 110, No. 25, 33-48, 53-64, 66 (June 21, 1972)

Growth in the pesticides industry has all but stopped due to increasing opposition from environmentalists, more stringent Federal and State regulations, and new application techniques that require smaller amounts of the chemicals. The industry is trying to develop pest-control products and application practices that are environmentally sound. As a result, pressure on the industry is beginning to ease and the producers expect that production and sales will increase again--possibly returning to the industry's historic 10 to 12% yearly growth rate by the end of the 1970's. The article includes a list of the leading producers of pesticides and their addresses. Tables are included that summarize information on pesticides including (1) products and producers, (2) U.S. patents and date of issue, (3) chemical name and structural formula, (4) physical properties, (5) product form, (6) oral toxicity LD_{50}, (7) major end uses, and (8) estimated production for 1971. One hundred and forty-six pesticides are listed. FTP

9.19 VOLATILITY OF DDT AND RELATED COMPOUNDS

Spencer, William F., and Mark M. Cliath (Soil and Water Conservation Research Division, ARS, U.S. Department of Agriculture, University of California, Riverside, CA 92502)
Journal of Agricultural and Food Chemistry 20, No. 3, 645-649 (May-June 1972)

Volatilization and vapor phase transport are important processes in the dissipation of pesticides, including the so-called "nonvolatile" pesticides such as DDT. This article gives data on the vapor pressure and relative volatility of some DDT isomers, impurities in the technical material, and potential breakdown products; and it examines their behavior when applied to soil.

The vapor densities of DDT and related compounds were determined by a gas saturation method. In this technique N_2 gas was passed through insecticide-treated sand or soil at a sufficiently slow rate to insure equilibrium vapor saturation [the procedure is described by W. F. Spencer and M. M. Cliath, Environ. Sci. Technol. 3, 670 (1969)].

In order to study the vapor phase desorption and potential volatility of the chemicals from soil, technical grade DDT was added to Gila silt loam (a calcareous, desert soil containing 6% organic matter and 18.4% clay). Some of the samples of soil treated with DDT were air dried to 2.2% water content to provide data on the effect of soil water content on the vapor density of DDT. The competitive effect of certain other pesticides on the vapor density of DDT was examined by applying either p,p'-DDT or o,p'-DDT to Gila silt loam with and without the addition of the other (accessory) pesticide. The accessory pesticide was either the other isomer of DDT or recrystallized dieldrin.

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9.19 DDT RESIDUES IN WHITE CROAKERS

Castle, William T., and Leon A. Woods, Jr. (Wildlife Management Branch, California Department of Fish and Game)
California Fish and Game 58, No. 3, 198-203 (July 1972)

The level of DDT residues in white croaker (Genyonemus lineatus) flesh (group A) and flesh with the skin left on (group B) was determined by gas liquid chromatography. The percent fat in group A and group B also was determined. There are significant differences ($P < .01$) between levels of DDT and between the percent fat in the two groups. The fat determined for group A was 3.76% (SE = 0.37%) and for group B was 6.06% (SE = 0.48%). The total DDT residue (including pp'DDT, its metabolites, and isomers) for group A was 10.82 ppm (SE = 0.96 ppm) and for group B was 18.23 ppm (SE = 1.95 ppm). The only residues detected at the limit of detection of 0.01 ppm were 1,1-dichloro-2-(o-chlorophenyl)-2-(p-chlorophenyl)ethylene, (op'-DDE); 1,1,1-trichloro-2-(o-chlorophenyl)-2-(p-chlorophenyl)ethane, (op'DDT); 1,1-dichloro-2,2-bis(p-chlorophenyl)ethane, (pp'DDD); and 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane, (pp'DDT). Many of the samples analyzed exceeded U.S. Food and Drug Administration guideline tolerance of 5.0 ppm wet weight for total DDT. [1 figure, 3 tables, 10 references] Authors' abstract

9.19 CONTAMINATION OF THE SEAS AND OCEANS BY ARTIFICIAL RADIO ACTIVITY

Preston, A. (Ministry of Agriculture, Fisheries and Food, Fisheries Radiobiological Laboratory, Lowestoft, Suffolk, United Kingdom)
Underwater Journal and Information Bulletin, No. 2, 49-58 (Apr. 1972)

Controlled disposal of radioactive waste to the marine environment has been practiced for over 25 years. International concern over such practices led to studies which endorsed the view that low and intermediate level radioactive wastes could be safely disposed of into the sea under properly controlled conditions. The International Atomic Energy Agency Report, IAEA (1961): Radioactive Waste Disposal Into the Sea. IAEA Safety Series No. 5, 174 pp. IAEA, Vienna, Austria, was the first document to give detailed guidance at an international level for the controlled disposal of a toxic waste material into the sea. The prime objective of controlled disposal of radioactive wastes is to ensure that irradiation of the public remains within the International Commission on Radiological Protection recommended dose limits. If these limits are instituted, damage to marine resources will be negligible. Control is achieved by assessing the potential consequences of any proposed disposal, prior to operation, by application of critical path analysis techniques, which includes a quantitative assessment of the habits of the public leading to radiation exposure. A limiting environmental capacity for radioactive materials is thus established. Within this capacity, disposal will be permitted only to an extent commensurate with the justifiable needs of the operator. Economic, social, and political considerations must be also taken into account. Thus only a fraction of the limiting environmental capacity will be used.

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9.19 INTERACTION OF VITAMIN A AND DIELDRIN ON MALLARD LIVER LIPIDS AND BIOTIN CONTENT

Nelson, J. R., L. E. Wookey, C. F. Nockels, and J. V. Shutze (Department of Avian Science, Colorado University, Fort Collins, CO 80521)
Poultry Science 51, No. 3, 747-751 (May 1972)

Earlier work has shown that chronic ingestion of a low level of a pesticide by wild birds may not produce immediately recognizable toxicity symptoms but may cause an imbalance of some aspect of the metabolic processes. In this study, the effects of ingestion of low levels of dieldrin by Mallards on vitamin A utilization was examined.

Day-old Mallard ducks were used. They were placed on a basal vitamin A deficient ration to make them marginally deficient so that the influence of dieldrin on subsequent utilization of vitamin A could be determined. Dieldrin was administered to the Mallards daily for a period of 12 weeks at the rate of 1.0 mg./kg. of body weight. The dieldrin was mixed with a protein base and appropriate quantities of the mixture were placed in gelatin capsules. The capsule containing the dieldrin was administered to the ducks by placing it at the base of the duck's tongue and flushing the mouth with water. The experimental diet was fed to the ducks for 12 weeks (at the end of this period the ducks were 18 weeks old).

After 12 weeks on the experimental diet containing dieldrin, the ducks showed no gross symptoms of dieldrin toxicity. After 5 weeks on the experimental diet, the ducks fed dieldrin showed marked footpad keratinization. The vitamin A levels in the livers of the ducks were not affected by chronic ingestion by the ducks of 1.0 mg./kg. of body weight of dieldrin. The biotin level in the liver of the

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Where significant fractions of the limiting capacity are utilized, sensible monitoring operations would be conducted, particularly in shallow and estuarine waters. In the past, the major source of artificial radioactivity in the oceans has been caused by nuclear weapon testing (10^9 curies in the world ocean by 1970, the contamination being widespread and low level). By comparison, contribution from controlled radioactive waste disposal has been small (10^6 curies by 1970), and the resulting contamination geographically restricted. The present and foreseeable need for global monitoring can be limited to monitoring the rates of introduction of radioactivity and to the establishment of an international register of disposals.
[1 figure, 3 tables, 8 photographs, 21 references] SW

9.19

ducks fed dieldrin was lower than in the liver of the ducks which were not fed the pesticide.

The fatty acid composition of the liver was altered by the ingestion of dieldrin or by the deficiency of vitamin A. There was a significant accumulation of stearic and palmitic acids in the liver with a comparable reduction of their monoenoic derivatives in the dieldrin-fed ducks when vitamin A was adequate in the diet. There were higher levels of long chain polyunsaturated fatty acids (18:2, 18:3, 20:4) in the livers of the dieldrin-fed ducks when vitamin A was deficient (as compared to when vitamin A was adequate).

The authors conclude that dieldrin, at the level fed to the ducks, had a marked depressant effect on the biotin content of the liver and altered the composition of the fatty acids of the liver possibly by interfering with the enzyme systems involved in the metabolism of the lipids.
[3 tables, 14 references] FTP

9.19 EFFECTS OF DIELDRIN IN SEAWATER ON THE DEVELOPMENT OF TWO SPECIES OF CRAB LARVAE, LEPTODIUM FLORIDANUS AND PANOPEUS HERBSTII

Epifanio, C. E. (Dep. Zool., Duke Univ., Durham, N.C.)
Chemical Abstracts 76, No. 21, 122608u (May 22, 1972)

9.19

The o,p′ isomers of DDT are more volatile than the p,p′isomer of DDT; the vapor pressure of o,p′-DDT is 7.5 times that of p,p′-DDT. The composition of the atmosphere at 30° C. in equilibrium with technical grade DDT added to silica sand at the rate of 1-2% was about 62% o,p′-DDT, 16% o,p′-DDE, 14% p,p′-DDE, and 8% p,p′-DDT. The atmosphere in and above moist soil containing technical grade DDT up to 20 μg./g. showed equal quantities of o,p′-DDT and p,p′-DDT, but at higher concentrations of DDT in the moist soil the ratio of o,p′-DDT to p,p′-DDT in the atmosphere increased. When dieldrin was applied with DDT to soil, no effect on the DDT vapor density was noted, and the interaction between o,p′-DDT and p,p′-DDT was slight. The volatility of all the compounds was reduced when they were applied to air-dried soils. p,p′-DDE (the primary breakdown product of DDT) has a higher vapor pressure than the original compound (p,p′-DDT) indicating that much of the DDT now present in soil may volatilize as DDE.
[3 figures, 5 tables, 17 references] FTP

9.19 RELATION BETWEEN MERCURY CONTENT OF HAIR AND AMOUNT OF FISH CONSUMED (9.15)

Yamaguchi, Seiya, Hisao Matsumoto, Sachiko Matsuo, Shunsuke Kaku, and Michiyo Hoshide (Sch. Med., Kurume Univ., Kurume, Japan)
Chemical Abstracts 76, No. 19, 108957a (May 8, 1972)

9.2 (1.51) SIMULATION OF THE CHANGES IN ABUNDANCE OF THE COD (GADUS MORHUA L.) AND THE DISTRIBUTION OF FISHING IN THE NORTH ATLANTIC

Clayden, A. D. (Glamorgan County Council, Cardiff, Wales, United Kingdom) Fishery Investigations, Series II, 27, No. 1, 58 pp. (1972) Ministry of Agriculture, Fisheries and Food, London, England. Price £1.50.

Applied research into fish populations seeks to understand the mechanisms behind population changes. These mechanisms are incorporated into mathematical models which describe the size and structure of a population at known times and conditions. Various cod stocks of the North Atlantic were studied using individual population models. The effect of different levels of fishing effort was predicted. A computer program simulated the change in abundance of the cod stocks for each year since 1946. Total national fishing efforts in each month of each year were distributed between stocks by the program on the basis of the catch from each stock by each nation. The international fishing effort was applied to the calculated resources to compare changes in the stocks and catches from them.

Depending on the magnitude of recruitment and the amount of fishing applied, the stocks (in the program) are either increasing, maintaining, or decreasing in abundance. The more abundant the stocks, the more likely heavier fishing effort will be applied, which will cause a reduction in the stocks.

Information generated by the computer suggests that catches from most of the North Atlantic stocks cannot be increased greatly (and maintained at a higher level) by further increases in fishing effort. In addition, the catch per unit effort would fall if fishing effort were to increase. Since there is sufficient data in the simulations, changes in the abundance of cod stocks in the northeast Atlantic can be explained satisfactorily. The simulation is less accurate for the northwest Atlantic stocks due in part to insufficient data. SW

9.1 SEASONAL CHANGES IN THE COMPOSITION OF THE BLOOD OF SOME SPECIES OF FISH

Khamidov, D. Kh., B. S. Gil'dieva, L. M. Zaremskaya, A. T. Akilov, A. A. Turdyev, K. N. Nishanbaev (Tashk. Gos. Med. Inst., Tashkent, U.S.S.R.)
Chemical Abstracts 76, No. 11, 56911j (Mar. 13, 1972)

6.55 (6.195)(9.2) THE BRITISH COLUMBIA RANDOM SAMPLE EGG LAYING TEST: EVALUATION OF SIX COMMERCIAL LAYER RATIONS WITH TWO STRAINS OF PULLETS

Biely, Jacob (University of British Columbia, Vancouver, British Columbia, Canada), C. W. Wood, and W. H. Pope (British Columbia Department of Agriculture, Victoria, B.C., Canada)
Feedstuffs 44, No. 25, 33-34, 36 (June 19, 1972)

The standard egg laying test was conducted with mature pullets reared on a poultryman's premises and sent to the test station prior to onset of laying. About 20 years ago the random-sample egg laying test began to replace the standard test.

The random-sample test is carried out with baby chicks hatched at the testing station from eggs collected at random from the breeders' farms, representing the type of stock offered for sale to the commercial poultry man.

The purpose of the test is to assess the production characteristics of different strains of birds under similar environmental conditions of brooding, rearing, and laying. The standard conditions make it possible to make a valid comparison of the economic traits of different strains of stock. One of the criteria most often used in assessing the economic potential of a strain is the income over feed and pullet cost. The popularity of the tests and related competition among breeders has led to strains of birds with high egg production. These improvements have been supported by the development of feeds which stimulate the laying bird to produce large numbers of high-quality eggs. In addition, efficiency of feed conversion has improved.

(over)

9.3 (2.05) COMMUNICATING WITH THE CONSUMER. SPECIAL REPORT: PART II. SAFETY OF FOOD SUPPLY

Foster, E. M. (Food Research Institute, University of Wisconsin, Madison, WI 53706)
Food Product Development 6, No. 4, 76, 78, 80 (June-July 1972)

Safety of the food supply is in question by those who argue that Americans are being poisoned by chemical additives in their food and by environmental contaminants such as pesticide residues, mercury, and microorganisms. The author surveyed food safety in the United States. All types of food poisoning are estimated to affect from 5 to 20 million people annually. In 1969, 91% of food poisoning cases was caused by microorganisms or their toxic products. The U.S. Food and Drug Administration (FDA) has labeled microbiological contamination the primary problem. Organisms that cause botulinum and salmonella contamination are the best known. Staphylococcal and perfringens poisonings combined account for over half of all food borne disease. Commercially prepared foods are rarely involved and commercially canned foods almost never. Most cases are caused by improper preparation or handling of the food. The FDA continually inspects processed foods for Salmonella. When such contamination is found the product is removed from the market. Thirty-one recalls were made in 1970, and most of them involved dried milk, raw eggs, or egg-containing pasta products.

Convenience foods [for example, cake mixes, precooked fish] are popular in America. They require chemical additives for a variety of purposes: to prevent caking, emulsify fat, inhibit rancidity, inhibit microbial spoilage, neutralize acid, increase viscosity, and for other purposes. Consumer groups oppose the addition of these chemicals to foods. They accuse the regulatory agencies of laxity

(over)

9.2 INCORPORATING A FISHING BUSINESS

Smith, Frederick J. (Marine Economics, Oregon State University, Corvallis, OR 97331) Extension Marine Advisory Program, No. 11, 8 pp. (n.d.) Oregon State University Corvallis, OR 97331

This manual is intended to assist in determining whether or not to incorporate a small fishing business. It lists a number of considerations including management, ownership, liability, taxation, finance and fringe benefits. A review of these considerations provides a basis for deciding whether to employ an incorporation specialist. This manual is not a substitute for the services such a specialist provides.

This manual discusses a number of considerations regarding the incorporation of a fishing business. These are:

1. Division of ownership is more feasible within a corporation.
2. The corporation may have a perpetual life and the business transferred from generation to generation regardless of the life span of various individuals involved.
3. Operation and management of a corporation usually implies more clearly specified management responsibilities and procedures but may be more complicated than with a proprietorship.
4. Owners of a corporation assume liability up to their share of ownership while the proprietor may be liable up to the value of his entire business and personal property.

(over)

9.3 (9.17) PYRRHIC VICTORIES FOR THE FRIENDS OF WHALES

Anonymous
Nature 238, No. 5358, 4 (July 7, 1972)

Results of the annual meeting of the International Whaling Commission (IWC) produced mixed reactions among academic, government, and business interests. J. L. McHugh, chairman of the IWC, indicated the achievements of the meeting as: (1) a complete and indefinite ban on the taking of blue, right, gray, bowhead, and humpback whales; (2) the introduction of international observers on all whaling vessels; (3) the abolition of the "blue whale unit" (the unit equates 1 blue whale to 2 fin whales, to 2.5 humpback whales, and to 6 sei whales); (4) reduction of catch quotas on the endangered species and the introduction of a quota on the minkie whale; (5) the creation of a committee to examine the procedures of the IWC. The 1971 catch and quota data and the whale quotas for 1972-73 are shown in the table.

(over)

9.2

5. Corporations pay taxes at one of two rates while the rates for a proprietor range from 14 to 70 percent in 24 steps. Taxation procedures for a corporation can be much more complicated than for the proprietor and the total tax may be higher.

6. A number of fringe benefits such as group insurance, profit sharing and retirement plans can be obtained by incorporating.

7. Incorporating may make it more feasible to borrow money and makes it possible to issue stock to the public to raise money.

8. Incorporating usually requires more records and paperwork. Although this requires more time and probably more accounting expense, it may also improve the management and profitability of the business.

9. A corporation normally incurs more legal and accounting expenses than a proprietorship, not only in the process of incorporating but in conducting its business each year. Author's abstract and summary

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9.3 (9.17)

Area	Species of whales	Quota for 1972-73	Catch in 1971	Quota in 1971
Antarctic	Fin	1,950	2,683	2,300 BWU [1]
	Sei	5,000	5,456	
	Minkie	5,000	3,020 [2]	
North Pacific	Fin	650	732	1,046
	Sei	3,000	3,463	3,768
	Sperm,		7,328	10,841
	Male	6,000		
	Female	4,000		
Southern Hemisphere	Sperm,		10,796	No quota
	Male	8,000		
	Female	5,000		
Total		38,600	41,000 [3]	

[1] BWU = Blue Whale Units
[2] Not included in the Blue Whale Unit
[3] Approximately. Includes all the large whales in all areas, but does not include several thousand small whales and more than 250,000 dolphins which are not protected.

[1 table] FTP

6.55 (6.195)(9.2)

Other experiments with nutrients, in conjunction with the random test, have been conducted in Canada and the United States. In one test, birds were fed a ration containing 17.2% protein until egg production reached 50%. Then they received a ration in which the protein was reduced to 13.4%. No change occurred in egg production which was realized in an $0.18 per pullet increase in profit. Variations in energy content were tested in layer rations. Low-energy layer rations realized higher egg profits.

In experiments which varied the source of protein in egg laying rations, no significant results were found using additives of soybean meal or animal protein concentrates. At the request of the Canadian poultry industry six commercial layer rations were tested by the random-sample method. Chemical analysis of feed samples were undertaken to establish the amount of nutrients. Wide variations in amount of nutrients in rations from each source were found indicating the need for better quality control in feed preparation. Two strains of Leghorn-type chickens were tested. The egg laying characteristics of both strains were high. The averages were 262.2 eggs in 364 days per bird for strain 1 and 258.8 eggs per bird for strain 2. Differences in feed consumption were significant and related to wide differences in fat content of the feeds. There were marked differences in egg yolk color indicating a need for enriching the feeds with grain containing xanthophyll. The annual mortality rate for strain 1 was 12.1% and 5.7% for strain 2. The net income per bird of strain 1 was $3.90 and $3.56 for strain 2, a difference of $0.34, which was not considered to be significant.

Any conclusions that may be drawn from these test results must be made with reservations since many intangible factors may affect egg production.
[6 figures, 3 tables, 6 references] SW

9.3 (2.05)

toward the food industry they are supposed to regulate by not restricting use of the additives. The author indicates that only substances generally regarded as safe (GRAS) are used with FDA approval; all other chemicals must be approved by the FDA. The author disagrees with allegations that the regulatory agencies are too heavily influenced by the food industry to the detriment of the consumer.

The FDA has done relatively little direct testing of food additives for safety. Operation of the National Center for Toxicological Research in Arkansas will provide for large-scale studies of additives. Food-processing companies have taken many steps to protect the consumer. It is in their interest to do so. They have increased their scientific competence to improve processing, assure adequate quality control, remove hazards from processing and product, and support research on food safety. The mission of the Food Research Institute, which the author heads, is to generate, assemble, and distribute information on safety of foods. University, State, Federal, and private foundation funds support many of the Institute's operations. A substantial share of funding is given by the food industry. The author believes that the control system is working, but all parties concerned should be alert to changing operations and new scientific information. SW

8.51 GEL FRACTION IN FISH MUSCLE PROTEIN EXTRACTS. II. PROPERTIES OF GEL FRACTION PROTEIN (0.6)

Umemoto, Shigeru (Tokai Reg. Fish. Lab., Tokyo, Japan)
Chemical Abstracts 76, No. 15, 84590x (Apr. 10, 1972)

8.5 ELECTROPHORETIC ANALYSIS OF SERUM PROTEINS IN THE BLOOD OF THE NORTHWESTERN ATLANTIC SILVER HAKE (7.51)

Volkov, V. S. (U.S.S.R.)
Chemical Abstracts 76, No. 9, 44134v (Feb. 28, 1972)

8.0 ATLAS OF NUTRITIONAL DATA ON UNITED STATES AND CANADIAN FEEDS
(6.190)

Anonymous
Prepared by the Subcommittee on Feed Consumption, Committee on Animal Nutrition, Agricultural Board, National Research Council, United States and Committee on Feed Conposition, Research Branch, Department of Agriculture, Canada
Available from the National Academy of Sciences, 2101 Constitution Ave., Washington, DC 20418 (1971), xvi + 772 pp. Price $12.50.

This book records the names of feeds and analytical data on feeds that have been published in various books, bulletins, and regulations. The tables of feed composition contain data on 6,152 feeds; data are presented on "as fed" and "dry" basis; a coefficient of variation for each nutrient for which there are four or more analyses; data on the digestible and metabolizable energy of feeds for cattle, horses, sheep, and swine; the metabolizable energy of the feeds commonly fed to poultry; and the net energy of some cattle feeds. The tables should be useful to feed manufacturers, feed dealers, nutrition consultants, research specialists, government agenices, teachers, students, county agricultural agents, and farmers.
FTP

8.50 CHEMICAL COMPOSITION OF THE RED CRAB PORTUNUS PELAGICUS
(8.0)

Badawi, H. K. (Inst. Oceanogr. Fish., Alexandria, U.A.R.)
Chemical Abstracts 76, No. 15, 83755t (Apr. 10, 1972)

9.17 THE CONTROLLED ENVIRONMENT 1984
(0.8)

McGrath, William L. (Operations Europe, Carrier Overseas Corporation, London, England)
ASHRAE Journal 14, No. 6, 56-59 (June 1972)

The author is an official of an air-conditioner manufacturing firm. He reviewed the history of air conditioning in homes and office buildings in relation to trends of rising income, population, and urbanization. The high demand for environmental control in domestic and commercial buildings in the near past and present was mentioned. These trends have led to the following developments: (1) a crisis in the availability of electrical energy at peak load demand, (2) a shortage of nonpolluting fuel, (3) defective urban ecology, (4) solid waste disposal problems, (5) air pollution, (6) spreading water pollution, and (7) fire control problems in tall buildings.

The author suggests that by 1984 the concept of environmental control will be broader than what is meant by the terms "heating" and "ventilation." The new concept will be associated with a new respect for the value of energy; design practices and development of technology will conform to the new view. The change will be reflected in buildings designed to conserve energy, air conditioning systems that use less electrical energy, and environmental systems that capture waste energy to reduce total energy demand. Based on complete environmental control, new low-cost housing designs and community ecology will make efficient use of land resources through high-density dispersal.
SW

9.10 THE INSTABILITY OF OCEAN POPULATIONS
(9.19)

Longhurst, Alan (Institute for Marine Environmental Research, Plymouth, England), Michael Colebrook, John Gulland, Robin Le Brasseur, Carl Lorenzen, and Paul Smith
New Scientist 54, No. 798, 500-502 (June 1, 1972)

In the study of man's influence on life in the oceans, we must, first, realize that man's effects in the open ocean are not inherently improbable because of the vastness of the ocean, and, secondly, inasmuch as large-scale fluctuations in the populations of marine organisms occur naturally we must not assume that these natural fluctuations reflect the effects of man and his technology. The authors discuss briefly natural fluctuations of marine organisms that have occurred throughout the world including the anchovy populations off the California coast, the sardine population off Japan, and the cod and haddock resources in the North Sea. The fluctuations in abundance of these species were correlated with certain natural environmental and biological changes.

The ocean is a restless and a changing environment; its changes may be sudden and dramatic or may be covert and sustained for very long periods. These changes can be revealed and measured only by widespread and sustained ocean monitoring operations. But, pollution monitoring programs can be successful only if the natural changes in the physical environment are monitored continuously and indefinitely and are understood. Natural fluctuations in populations of marine animals already have been incorrectly ascribed to the effects of pollutants. A serious impact on the environment could pass unnoticed through ignorance of the instability of natural populations or through a lack of monitoring of the oceans. [4 figures]
FTP

9.6 NEW BALTIC MANUAL
(1.0144)

Carlberg, Stigr. (Fishery Board of Sweden) (editor)
Cooperative Research Report Series A, No. 29, 145 pp. (Apr. 1972) (International Council for the Exploration of the Sea, Charlottenlund Slot, DK-2920 Charlottenlund, Denmark)

During the period January 1969-April 1970, the Baltic oceanographers carried out a big cooperative project called the International Baltic Year. All nations bordering the Baltic participated. Numerous oceanographic and biological samples were collected; standardized methods of analysis were required. To meet this requirement a manual was produced for that project. A new edition of that manual was published and major subtopics in it are as follows: Station network (of the Baltic Sea); General comments on the chemical methods; Salinity and the carbonate system; Oxygen conditions; Nutrients (inorganic); Organic matter (nonnutrient); Determination of reactive arsenate; Optical methods; and Biological methods (sampling techniques, measurement of photosynthetic production, fish eggs and larvae).
SW

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Fisher, Terrance N.	20	9.15
Foster, E. M.	23	9.3
Fox, M. R. Spivey	6	0.7
Frieden, Earl	1	0.4
Gergely, J.	1	0.35
Gil'dieva, B. S.	22	9.1
Goodale, Thomas L. (ed.)	19	9.19
Gordon, R. W.	19	9.19
Grosch, W.	12	4.5
Guild, Louise	5	0.7
--	5	0.7
Gulland, John	25	9.10
Hipkins, Fred W.	10	2.118
Hjul, Peter	17	9.16
Hooper, S. N.	11	4.13
Hoshide, Michiyo	22	9.19
Hosko, Michael J.	20	9.15
Hyder, Kamaluddin	13	6.54
Inglett, G. E.	3	0.6
Irsigler, K.	2	0.39
Irukayama, Katsuro	18	9.15
Ishii, Kiyofumi	5	0.6
--	5	0.6
--	6	0.6
Jeske, Jozef	12	4.13
Johnson, H. M.	3	0.5
Johnson, Oscar	20	9.19
Kajikawa, Masahiro	5	0.6
Kaku, Shunsuke	22	9.19
Kelleher, M.	11	4.13
Khamidov, D. Kh.	22	9.1
Kies, Constance	7	0.7
Knaggs, Eric H.	8	2.11
Krishnamurthy, K.	15	9.10
Kryspin-Exner, K.	2	0.39
Kuwahara, Shunsuke	18	9.15
Kuwayama, Motoaki	5	0.6
Labrenz, Janice Bate	6	0.7
Lachance, Paul A.	6	0.6
Lahav, M.	15	9.15
Lantz, A. W.	12	3.4
Larkin, P. A. (ed.)	9	1.3
Learson, R. J.	10	2.3
--	13	7.8
Le Brasseur, Robin	25	9.10
Lechner, Jack	9	1.3
Lee, Richard F.	1	0.32
Lewis, D.	7	0.7
Lewis, D. H.	16	9.15
Li, Kwan-Ming	10	2.9
Longhurst, Alan	25	9.10
Lorenzen, Carl	25	9.10
Lozow, Jeffrey B.	15	9.12
Malins, Donald C.	2	0.4
Mann, H.	18	9.16
--	20	9.19
Matsuhashi, T.	14	6.33
Matsumoto, Hisao	22	9.19
Matsuo, Sachiko	22	9.19
McGrath, William L.	25	9.17
McLain, L. R.	17	9.16
Merna, James W.	17	9.15
Mirvish, Sidney S.	1	0.35
Misaki, Masaru	6	0.6
Money, Vida G.	17	9.16
Mori, Hiroshi	5	0.6
Moskowitz, Ruth Brown	6	0.6
Nelson, J. R.	21	9.19
Nice, E.	4	0.4
Nishanbaev, K. N.	22	9.1
Nockels, C. F.	21	9.19
Novy, James R.	17	9.15
Okamoto, Nagaoki	5	0.6
Okazaki, Akio (ed.)	13	6.3
Owen, W.	11	3.337
Parnow, Robert J.	4	0.5
Partmann, W.	2	0.34
Pesenson, I. B.	4	0.8
Peterson, Clifford L. (ed.)	7	1.1
Peterson, Jack E.	20	9.15
Pope, W. H.	23	6.55
Preston, A.	21	9.19
Puppione, Donald L.	1	0.32
Reid, Gerald M.	7	1.22
Reierstad, G.	10	2.3
Ronsivalli, L. J.	13	7.8
Rust, Elizabeth	5	0.7
--	5	0.7
Sarig, S.	15	9.15
Savage, N. L.	16	9.15
Scherf, E.	18	9.16
Schwartz, M.	13	7.8
Seidel, J. C.	1	0.35
Senser, F.	12	4.5
Servizi, J. A.	19	9.19
Shifrin, S. M.	4	0.8
Shubik, Philippe	1	0.35
Shutze, J. V.	21	9.19
Simon, Raymond C. (ed.)	9	1.3
Smith, Frederick J.	23	9.2
Smith, Paul	25	9.10
Soderquist, M. R.	8	0.8
Spaulding, P. L.	3	0.5
Spencer, William F.	21	9.19
Stauffer, C. E.	4	0.6
Stewart, Richard D.	20	9.15
Subbaraju, R. C.	15	9.10
Suomala, John B.	15	9.12
Toda, Jun	5	0.6
--	5	0.6
--	6	0.6
Trust, T. J.	17	9.16
Turdyev, A. A.	22	9.1
Twedt, R. M.	3	0.5
Umemoto, Shigeru	24	8.51
Varanasi, Usha	2	0.4
Ventz, Dieter	4	0.8
Vernberg, John	20	9.19
Vernberg, Winona B.	20	9.19
Visek, Willard J.	7	0.7
--	8	0.7
Volkov, V. S.	24	8.5
Wada, Takeo	5	0.6
--	6	0.6
Wall, J. S.	3	0.6
Wallcave, Lawrence	1	0.35
Wasserman, A. E.	11	3.11
Wassermann, M.	18	9.16
Wekell, John C.	2	0.4
Wholzogen, F. X.	2	0.39
Williams, K.	4	0.4
Winawer, Henry H.	6	0.6
Wolff, I. A.	11	3.11
Wood, C. W.	23	6.55
Woods, Leon A., Jr.	21	9.19
Wookey, L. E.	21	9.19
Yamaguchi, Seiya	22	9.19
Yasumatsu, Katsuharu	5	0.6
--	5	0.6
--	6	0.6
Yasutake, William T.	15	9.15
Zabbarov, A. N.	4	0.8
Zaremskaya, L. M.	22	9.1
Zaugg, W. S.	17	9.16
Zinck, M. E.	19	9.19

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